

# The Mining And Metallurgical Journal

VOL. XXII, No. 8

LOS ANGELES, CAL.,

January 15, 1900,

NEW YORK, N. Y.

Price 15 Cents

## Analytical Chemists and Assayers

Analysis made of ORES, Water, Chemicals, Clays, &c. Umpires Work a Specialty  
HARDIN & MORRISON,

164 Chestnut Street. PHILADELPHIA, PA.

## WM. M. COURTIS, A. M.

Mining and Metallurgical Engineer

Assayer and Analytical Chemist

Office: 415 Hammond Building, Permanent Address, 449 4th Ave. Detroit, Mich.

## PATENTS!

TOWNSEND BROTHERS SOLICITORS OF PATENTS  
Patents on Inventions secured in all countries. Copyrights, Trade Marks and Labels.  
Office, 331 Potomac Block  
Telephone 247. Los Angeles, Cal.

## The Edward P. Allis Company

MILWAUKEE, WISCONSIN

SEE PAGE 11a



## DANIEL'S P.P.P. ROD PACKING

FOR ALL RODS:

Steam, Water, Ammonia, etc.

You get your money's worth, or you get your money back.

TRY IT.

## QUAKER CITY RUBBER COMPANY,

409 MARKET ST., PHILADELPHIA, or 21 SO. CANAL ST., CHICAGO.

THE ROESSLER & HASSLACHER Chemical Co.

100 William St., New York

## CYANIDE

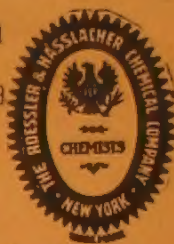
Peroxide of Sodium

Hyposulphite of Soda

Chloride of Lime

Sulphide of Iron

And Other Chemicals for Mining Purposes.



## Joseph Dixon Crucible Co.

MINERS, IMPORTERS AND MANUFACTURERS

GRAPHITE & PLUMBAGO

JERSEY CITY, N. J.

RETORTS, CRUCIBLES, GRAPHITE LUBRICANTS, BELT DRESSING, GRAPHITE PAINTS, LEAD PENCILS, AND GRAPHITE PRODUCTS OF ALL KINDS.

Send for Production Catalogue.

Graphite Makes the Best Lubricant and Best Paint.

## ADAMANTINE SHOES & DIES

AND

CHROME CAST STEEL

THE CANDA PATENT SELF-LOCKING CAM, Tappets, Bosses, Roll Shells & Crusher Plates Also Rolled Parts for Huntington and Other Mills

These castings are extensively used in all the Mining States and Territories throughout the world. Guaranteed to prove better and cheaper than any others. Orders solicited subject to above conditions. When ordering send sketch with exact dimensions. Send for Illustrated Circular.

CHROME STEEL WORKS,

Stamp Dies Kent Ave., Keap and Hooper Sts., BROOKLYN, N. Y.



## The Pelton Water Wheel

Affords the Most Economical and Reliable Power for Mining, Electric and all other purposes.

## 9000 WHEELS NOW RUNNING

PELTON WATER WHEEL CO., 121 Main St., San Francisco, Cal.

## Mexican, American and Foreign Patents, TRADEMARKS, ETC.

Reports on Mining and Other Properties. Proprietors of Weekly Anglo-American, a first-class Advertising Medium. Established 9 Years.

C. H. M. y Agramonte,

P. O. Box 388. Cable Address "Agra" CITY OF MEXICO, MEXICO.



WE are acting as Purchasing Agents for more than thirty mining companies. We desire to make contracts with others to act for them as their Purchasing Agents in this market. Give us an opportunity to send you information and references. We can save you money. Do you wish to receive our Market Letters, giving prices of machinery and supplies, condition of the market, probable change, etc?

1543 Marquette Building,

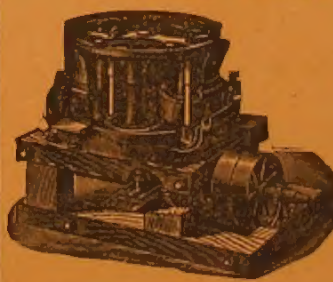
Chicago, Illinois

## PARKE & LACY COMPANY

21 and 23 FREMONT STREET, SAN FRANCISCO, CAL.

LICENSEE FOR THE MANUFACTURE AND SALE OF

## The Huntington Centrifugal Roller Quartz Mill



THE HUNTINGTON MILL is so well and favorably known among mining men throughout the world that any description of it would seem superfluous. They are in use in the United States, Canada, Mexico, Central and South America, Australia, China, Japan, and South Africa. In fact, wherever mines exist, and have given the best satisfaction of all quartz crushing mills.

The Construction of this mill has lately been much improved and we claim it to be the CHEAPEST, MOST EFFICIENT, SIMPLEST, AND MOST DURABLE MILL UPON THE MARKET.

Sole Agents for Knowles' Pumps and Pulsometer Pumps, Ingersoll-Sergeant Rock Drills and Air Compressors, Bullock Diamond Drills.

CATALOGUE UPON APPLICATION

Los Angeles, Cal. Office, 306 Byrne Building, W. H. Miller, Representative



## THEODORE LEXOW

Nos. 12 to 16 John St., near Broadway, N. Y. Importers of

## CARBONS

DIAMOND DRILLS and all Mechanical Purposes

Henry Dammert





## Peerless Spiral Piston and Valve Rod Packing

Expressly for High Speed  
Engines. Will Hold 400 lbs.  
Steam. The best packing for  
MINING USE

20 YEARS OLD  
AND NO EQUAL

## Rainbow Packing



THE COLOR OF RAINBOW PACKING IS RED

Three rows of Diamonds in Black through-  
out the length of each and every roll. No  
baking or following up.



FOR UNION HAND HOLES AND MAN  
HOLES.  $\frac{3}{4}$  in. for pipe unions.  $\frac{1}{2}$  in. for  
hand holes  $\frac{3}{4}$  in. for manholes.  $\frac{1}{4}$  in. for extra  
large man-holes.

The Peerless Rubber Mfg. Co., 16 WARREN STREET, NEW YORK

10-24 Woodward Avenue, Detroit, Mich. 202-210 S. Water Street, Chicago, Ill.  
Dunham, Carrigan & Hayden Co., San Francisco, Cal.

## California Vigorit Powder Co.

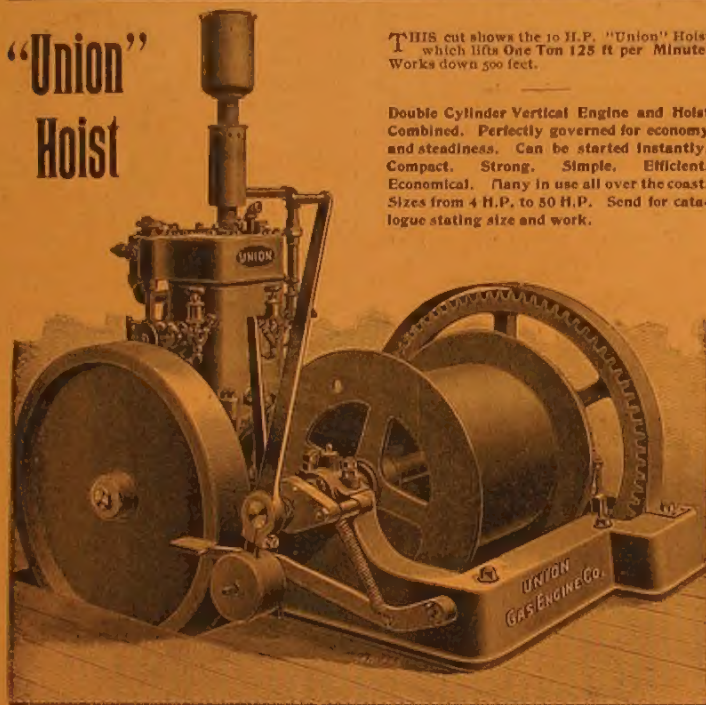
Manufacturers of

Dynamite High Explosives and "Vigorit Low" Blasting Powder

OFFICE: 208 California Street,  
San Francisco, Cal.

WORKS: Point Isabel,  
Contra Costa Co. Cal.

## "Union" Hoist



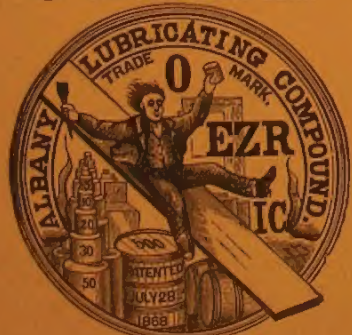
THIS cut shows the 10 H.P. "Union" Hoist  
which lifts One Ton 125 ft per Minute.  
Works down 500 feet.

Double Cylinder Vertical Engine and Hoist  
Combined. Perfectly governed for economy  
and steadiness. Can be started instantly.  
Compact. Strong. Simple. Efficient.  
Economical. Many in use all over the coast.  
Sizes from 4 H.P. to 50 H.P. Send for cata-  
logue stating size and work.

## Union Gas Engine Co.,

801 Howard Street, - - San Francisco, Cal.

The only Genuine ALBANY GREASE  
has this TRADE MARK on every pack-  
age. Look out for Yellow Label.



MANUFACTURERS OF  
Albany Dynamo & Albany Cylinder Oils  
If you are not using these Oils give them a trial  
at once, and we know the result. You will want  
no other

## ALBANY GREASE

Lubricates Everything  
Especially Adapted to Mining and Mill-  
ing Machinery.

MADE ONLY BY  
ADAM COOK'S SONS,  
313 WEST ST., NEW YORK.

BRANCHES:

TATUM & BOWEN,  
24 Fremont Street, San Francisco, Cal.  
49-49 First St., Portland, Oregon.  
South Canal Street, Chicago, Illinois.

## THOMPSON & BOYLE CO.

(INCORPORATED)

MANUFACTURERS OF

T. & B.

## STEEL MINING PIPE

Cyanide Tanks, Water Tanks, Air Pipe,  
Hydraulic Mining Material

310-314 Requesa St.,

Los Angeles, Cal.

## WILLIAM H. EMANUEL,

REPRESENTING

RAND DRILL COMPANY,  
THE EDW. P. ALLIS CO.,

Air Drills and Compressors  
General Mining, Milling and Smelting  
Machinery and Reynolds Corliss Engine  
Wire Rope and Bleichert Tramways  
General Service and Mining Pumps

TRENTON IRON CO.,  
HENRY R. WORTHINGTON,

ROBIN'S BELT CONVEYOR

DENVER

COLORADO

The Baker & Adamson Chemical Co.

MANUFACTURERS OF

Strictly Chemically Pure Acids and  
Chemicals and Ashless Filter  
Papers

BASTON,

PENNSYLVANIA

## Just Published

Manual of Hydraulic Mining

FOR THE USE OF THE

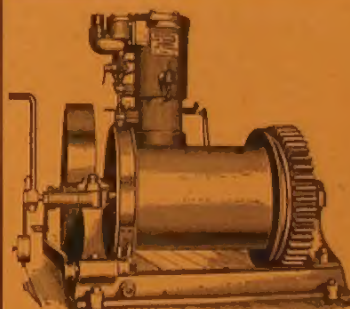
PRACTICAL \* MINER

By T. F. VAN WAGENEN

NEW AND REVISED EDITION

16mo, cloth, \$1.00.

D. VAN NOSTRAND CO., Publishers  
23 Murray and 27 Warren Sts., NEW YORK  
Copies sent by mail or express on receipt of price



## ORIENTAL HOIST

Any Size Built on Demand  
Simplest and Best Mining Hoist Built  
Write for Particulars and Prices

Oriental Gas Engine Co.

227 and 229 Polson Street,

SAN FRANCISCO, U. S. A.

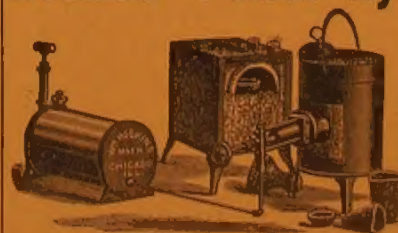
## Hoskins' Patent Hydro-Carbon

Blow-Pipe and  
Assay Furnaces

No dust. No ashes. Cheap, effec-  
tive, economical, portable and auto-  
matic. Send for Price-List to

WM. HOSKINS,

81 South Clark St., Room 57  
CHICAGO, ILL.





## ALPHABETICAL INDEX TO ADVERTISERS

A		B		C		D		E		F		G		H		I		J		K		L		M		N		O		P		Q		R		S		T		U		V		W		Y	
Abbott, W. O.	6a	Baily & Montg.	18a	California Performing Screen Co.	15a	Davis Iron Works Co., F. M.	16a	Rimer & Amend.	17a	Palbanks, Morse & Co.	7a	Galindo, Lic. Elias	15a	Hamlin & Morrison	1a	Independent Assay Office	18a	Jackson Drill and Manufacturing Co., The	18a	Keimpton, C. W.	15a	Leffel & Co., James	14a	Macbeth & Co., James	12a	National Association of Stationary Engineers	8a	Ogden Assay Office	4a	Pacific Tank Co.	18a	Quaker City Rubber Co.	1a	Reckhart, D. W.	15a	Santa Fe Bank	12a	Tatum & Bowen	6a	Union Gas Engine Co.	2a	Van Der Nallen, A.	5a	Wade & Wade	17a	Young & Sons	6a
Agramonte, C. H. M.	11a	Baker & Adamson Chemical Co.	2a	California Anti-Caloric Co.	8a	Demulston, E. G.	13a	Rimnuel, Wm. H.	2a	Pay & Egan Co., J. A.	12a	Godfrey, A. G.	4a	Hercules Gas Engine Co.	8a	Ingersoll Sergeant Drill Co.	9a	Queen & Co.	12a	Keuffel & Esser Company	6a	Lehigh University	2a	McKelvey, Chas. S.	14a	National Iron Works	17a	Oliver Powder Co.	14a	Paraffine Paint Co.	10a	Quick, John W.	12a	Reed, John T.	16a	S. P. Pioneer Screen Works	12a	Taylor & Co., John	16a	Van Nostrand Co., D.	2a	Watson, R. N.	17a	Young & Sons	6a		
Ainsworth, Wm. & Sons	11a	Baker & Co.	8a	California Vigoril Powder Co.	2a	Denver Fire Clay Co.	18a	Ryan-Evans Manufacturing Co.	19a	Perrari, Guido	14a	Gold & Silver Extract. Co. of America Ltd.	4a	Hendy Machine Works, Joshua	13a, 18a	Irving & Co., Jas.	8a	Quinn & Co.	12a	Kimbark, S. D.	6a	Lexow, Theo.	2a	McNamara, Geo. G.	14a	National Pipe Bending Co.	14a	Orbital Gas Engine Co.	2a	Perke & Lacy Co.	1a	Reckhart, D. W.	15a	Scarf & Sons, Wm. B.	12a	Taylor Iron and Steel Co.	6a	Van Wagenen, Theo. F.	5a	Weber Gas and Gasoline Engine Co.	12a	Young & Sons	6a				
Aitchison Perforated Metal Co., The Robert	15a	Baker Iron Works	18a	Chambers Sec'y, J. C.	8a	Denver Variety Machine Shop	12a			Possil Meal Co.	6a	Goodsell Packing Co.	16a	Henshaw, Bulkley & Co.	12a, 13a, 14a, 15a, 16a	Irving & Co., Jas.	8a	Quick, John W.	12a	Koblbach, Sr. Herman	13a	Lidgerwood Manufacturing Co.	4a	McCoy J. W.	14a	National Standard Co., (Inc.)	18a	Orbital Gas Engine Co.	2a	Pelton Water Wheel Co.	1a	Reckhart, D. W.	15a	Schoellkopf, Hartford and MacLagen, Ltd.	17a	Temple Machine Co.	15a	Van Wagenen, Theo. F.	5a	Weber & Co., F.	8a	Young & Sons	6a				
Allie Co., Edward F.	11a	Bell, Newton M.	14a	Chapman Smelting Works Co.	18a	Detroit Lubricator Co.	12a			Powell, G. C.	15a	Goodyear Rubber Co.	16a	Hersey, Clarence	9a	Irving & Co., Jas.	8a	Quick, John W.	12a	Kohlbusch, Sr. Herman	13a	Link Belt Machinery Co.	4a	McCoy Percy L.	17a	New Haven Manufacturing Co.	18a	Orbital Gas Engine Co.	2a	Penn Smelting and Refining Co.	14a	Reckhart, D. W.	15a	Sexton, J. H.	12a	Thompson & Boyle	12a	Van Wagenen, Theo. F.	5a	Weber & Co., F.	8a	Young & Sons	6a				
American Diamond Rock Drill Co.	15a	Berger & Sons, C. L.	18a	Chester Steel Castings Co.	8a	Dietzgen & Co., Eugene	14a			Freese, Adolf	9a	Gutta Percha Rubber and Mfg Co.	12a	Hoskins, Wm.	2a	Irving & Co., Jas.	8a	Quick, John W.	12a	Kohlbusch, Sr. Herman	13a			Manasse Co., J.	10a	National Standard Co., (Inc.)	18a	Orbital Gas Engine Co.	2a	Penn Smelting and Refining Co.	14a	Reckhart, D. W.	15a	Shaw, Willis	4a	Thompson & Boyle	12a	Van Wagenen, Theo. F.	5a	Weber & Co., F.	8a	Young & Sons	6a				
American Impulse Wheel Co.	17a	Bickford Drill Co.	16a	Chrome Steel Works	1a	Dixon Crucible Co., Jos.	16a									Irving & Co., Jas.	8a	Quick, John W.	12a	Kohlbusch, Sr. Herman	13a			Manasse Co., J.	10a	New Standard Co., (Inc.)	18a	Orbital Gas Engine Co.	2a	Penn Smelting and Refining Co.	14a	Reckhart, D. W.	15a	Shaw, Willis	4a	Thompson & Boyle	12a	Van Wagenen, Theo. F.	5a	Weber & Co., F.	8a	Young & Sons	6a				
American Injector Co.	17a	Bickford Drill Co.	16a	Cleveland Mining and Stock Exchange Co.	8a	Donaldson, A. M.	16a									Irving & Co., Jas.	8a	Quick, John W.	12a	Kohlbusch, Sr. Herman	13a			Manasse Co., J.	10a	New Standard Co., (Inc.)	18a	Orbital Gas Engine Co.	2a	Penn Smelting and Refining Co.	14a	Reckhart, D. W.	15a	Shaw, Willis	4a	Thompson & Boyle	12a	Van Wagenen, Theo. F.	5a	Weber & Co., F.	8a	Young & Sons	6a				
Aubury, L. E.	6a	Bickford Drill Co.	16a	Cling-Surface Manufacturing Co.	7a											Irving & Co., Jas.	8a	Quick, John W.	12a	Kohlbusch, Sr. Herman	13a			Manasse Co., J.	10a	New Standard Co., (Inc.)	18a	Orbital Gas Engine Co.	2a	Penn Smelting and Refining Co.	14a	Reckhart, D. W.	15a	Shaw, Willis	4a	Thompson & Boyle	12a	Van Wagenen, Theo. F.	5a	Weber & Co., F.	8a	Young & Sons	6a				
		Bickford Drill Co.	16a	Colorado Iron Works Co.	14a											Irving & Co., Jas.	8a	Quick, John W.	12a	Kohlbusch, Sr. Herman	13a			Manasse Co., J.	10a	New Standard Co., (Inc.)	18a	Orbital Gas Engine Co.	2a	Penn Smelting and Refining Co.	14a	Reckhart, D. W.	15a	Shaw, Willis	4a	Thompson & Boyle	12a	Van Wagenen, Theo. F.	5a	Weber & Co., F.	8a	Young & Sons	6a				
				Cook's Sons, Adam	2a											Irving & Co., Jas.	8a	Quick, John W.	12a	Kohlbusch, Sr. Herman	13a			Manasse Co., J.	10a	New Standard Co., (Inc.)	18a	Orbital Gas Engine Co.	2a	Penn Smelting and Refining Co.	14a	Reckhart, D. W.	15a	Shaw, Willis	4a	Thompson & Boyle	12a	Van Wagenen, Theo. F.	5a	Weber & Co., F.	8a	Young & Sons	6a				
				Courts, Wm. M., A. M.	1a											Irving & Co., Jas.	8a	Quick, John W.	12a	Kohlbusch, Sr. Herman	13a			Manasse Co., J.	10a	New Standard Co., (Inc.)	18a	Orbital Gas Engine Co.	2a	Penn Smelting and Refining Co.	14a	Reckhart, D. W.	15a	Shaw, Willis	4a	Thompson & Boyle	12a	Van Wagenen, Theo. F.	5a	Weber & Co., F.	8a	Young & Sons	6a				
				Cumner & Sons Co., F. D.	17a											Irving & Co., Jas.	8a	Quick, John W.	12a	Kohlbusch, Sr. Herman	13a			Manasse Co., J.	10a	New Standard Co., (Inc.)	18a	Orbital Gas Engine Co.	2a	Penn Smelting and Refining Co.	14a	Reckhart, D. W.	15a	Shaw, Willis	4a	Thompson & Boyle	12a	Van Wagenen, Theo. F.	5a	Weber & Co., F.	8a	Young & Sons	6a				
																Irving & Co., Jas.	8a	Quick, John W.	12a	Kohlbusch, Sr. Herman	13a			Manasse Co., J.	10a	New Standard Co., (Inc.)	18a	Orbital Gas Engine Co.	2a	Penn Smelting and Refining Co.	14a	Reckhart, D. W.	15a	Shaw, Willis	4a	Thompson & Boyle	12a	Van Wagenen, Theo. F.	5a	Weber & Co., F.	8a	Young & Sons	6a				
																Irving & Co., Jas.	8a	Quick, John W.	12a	Kohlbusch, Sr. Herman	13a			Manasse Co., J.	10a	New Standard Co., (Inc.)	18a	Orbital Gas Engine Co.	2a	Penn Smelting and Refining Co.	14a	Reckhart, D. W.	15a	Shaw, Willis	4a	Thompson & Boyle	12a	Van Wagenen, Theo. F.	5a	Weber & Co., F.	8a	Young & Sons	6a				
																Irving & Co., Jas.	8a	Quick, John W.	12a	Kohlbusch, Sr. Herman	13a			Manasse Co., J.	10a	New Standard Co., (Inc.)	18a	Orbital Gas Engine Co.	2a	Penn Smelting and Refining Co.	14a	Reckhart, D. W.	15a	Shaw, Willis	4a	Thompson & Boyle	12a	Van Wagenen, Theo. F.	5a	Weber & Co., F.	8a	Young & Sons	6a				
																Irving & Co., Jas.	8a	Quick, John W.	12a	Kohlbusch, Sr. Herman	13a			Manasse Co., J.	10a	New Standard Co., (Inc.)	18a	Orbital Gas Engine Co.	2a	Penn Smelting and Refining Co.	14a	Reckhart, D. W.	15a	Shaw, Willis	4a	Thompson & Boyle	12a	Van Wagenen, Theo. F.	5a	Weber & Co., F.	8a	Young & Sons	6a				
																Irving & Co., Jas.	8a	Quick, John W.	12a	Kohlbusch, Sr. Herman	13a			Manasse Co., J.	10a	New Standard Co., (Inc.)	18a	Orbital Gas Engine Co.	2a	Penn Smelting and Refining Co.	14a	Reckhart, D. W.	15a	Shaw, Willis	4a	Thompson & Boyle	12a	Van Wagenen, Theo. F.	5a	Weber & Co., F.	8a	Young & Sons	6a				
																Irving & Co., Jas.	8a	Quick, John W.	12a	Kohlbusch, Sr. Herman	13a			Manasse Co., J.	10a	New Standard Co., (Inc.)	18a	Orbital Gas Engine Co.	2a	Penn Smelting and Refining Co.	14a	Reckhart, D. W.	15a	Shaw, Willis	4a	Thompson & Boyle	12a	Van Wagenen, Theo. F.	5a	Weber & Co., F.	8a	Young & Sons	6a				
																Irving & Co., Jas.	8a	Quick, John W.	12a	Kohlbusch, Sr. Herman	13a			Manasse Co., J.	10a	New Standard Co., (Inc.)	18a	Orbital Gas Engine Co.	2a	Penn Smelting and Refining Co.	14a	Reckhart, D. W.	15a	Shaw, Willis	4a	Thompson & Boyle	12a	Van Wagenen, Theo. F.	5a	Weber & Co., F.	8a	Young & Sons	6a				
																Irving & Co., Jas.	8a	Quick, John W.	12a	Kohlbusch, Sr. Herman	13a			Manasse Co., J.	10a	New Standard Co., (Inc.)	18a	Orbital Gas Engine Co.	2a	Penn Smelting and Refining Co.	14a	Reckhart, D. W.	15a	Shaw, Willis	4a	Thompson & Boyle	12a	Van Wagenen, Theo. F.	5a	Weber & Co., F.	8a	Young & Sons	6a				
																Irving & Co., Jas.	8a	Quick, John W.	12a	Kohlbusch, Sr. Herman	13a			Manasse Co., J.	10a	New Standard Co., (Inc.)	18a	Orbital Gas Engine Co.	2a	Penn Smelting and Refining Co.	14a	Reckhart, D. W.	15a	Shaw, Willis	4a	Thompson & Boyle	12a	Van Wagenen, Theo. F.	5a	Weber & Co., F.	8a	Young & Sons	6a				
																Irving & Co., Jas.	8a	Quick, John W.	12a	Kohlbusch, Sr. Herman	13a			Manasse Co., J.	10a	New Standard Co., (Inc.)	18a	Orbital Gas Engine Co.	2a	Penn Smelting and Refining Co.	14a	Reckhart, D. W.	15a	Shaw, Willis	4a	Thompson & Boyle	12a	Van Wagenen, Theo. F.	5a	Weber & Co., F.	8a	Young & Sons	6a				
																Irving & Co., Jas.	8a	Quick, John W.	12a	Kohlbusch, Sr. Herman	13a			Manasse Co., J.	10a	New Standard Co., (Inc.)	18a	Orbital Gas Engine Co.	2a	Penn Smelting and Refining Co.	14a	Reckhart, D. W.	15a	Shaw, Willis	4a	Thompson & Boyle	12a	Van Wagenen, Theo. F.	5a	Weber & Co., F.	8a	Young & Sons	6a				
																Irving & Co., Jas.	8a	Quick, John W.	12a	Kohlbusch, Sr. Herman	13a			Manasse Co., J.	10a	New Standard Co., (Inc.)	18a	Orbital Gas Engine Co.	2a	Penn Smelting and Refining Co.	14a	Reckhart, D. W.	15a	Shaw, Willis	4a	Thompson & Boyle	12a	Van Wagenen, Theo. F.	5a	Weber & Co., F.	8a	Young & Sons	6a				
																Irving & Co., Jas.	8a	Quick, John W.	12a	Kohlbusch, Sr. Herman	13a			Manasse Co., J.	10a	New Standard Co., (Inc.)	18a	Orbital Gas Engine Co.	2a	Penn Smelting and Refining Co.	14a	Reckhart, D. W.	15a	Shaw, Willis	4a	Thompson & Boyle	12a	Van Wagenen, Theo. F.	5a	Weber & Co., F.	8a	Young & Sons	6a				
																Irving & Co., Jas.	8a	Quick, John W.	12a	Kohlbusch, Sr. Herman	13a			Manasse Co., J.	10a	New Standard Co., (Inc.)	18a	Orbital Gas Engine Co.	2a	Penn Smelting and Refining Co.	14a	Reckhart, D. W.	15a	Shaw, Willis	4a	Thompson & Boyle	12a	Van Wagenen, Theo. F.	5a	Weber & Co., F.	8a	Young & Sons	6a				
																Irving & Co., Jas.	8a	Quick, John W.	12a	Kohlbusch, Sr. Herman	13a			Manasse Co., J.	10a	New Standard Co., (Inc.)	18a	Orbital Gas Engine Co.	2a	Penn Smelting and Refining Co.	14a	Reckhart, D. W.	15a	Shaw, Willis	4a	Thompson & Boyle	12a	Van Wagenen, Theo. F.	5a	Weber & Co., F.	8a	Young & Sons	6a				
																Irving & Co., Jas.	8a	Quick, John W.	12a	Kohlbusch, Sr. Herman	13a			Manasse Co., J.	10a	New Standard Co., (Inc.)	18a	Orbital Gas Engine Co.	2a	Penn Smelting and Refining Co.	14a	Reckhart, D. W.	15a	Shaw, Willis	4a	Thompson & Boyle	12a	Van Wagenen, Theo. F.	5a	Weber & Co., F.	8a	Young & Sons	6a				
																Irving & Co., Jas.	8a	Quick, John W.	12a	Kohlbusch, Sr. Herman	13a			Manasse Co., J.	10a	New Standard Co., (Inc.)	18a	Orbital Gas Engine Co.	2a	Penn Smelting and Refining Co.	14a	Reckhart, D. W.	15a	Shaw, Willis	4a	Thompson & Boyle	12a	Van Wagenen, Theo. F.	5a	Weber & Co., F.	8a	Young & Sons	6a				
																Irving & Co., Jas.	8a	Quick, John W.	12a	Kohlbusch, Sr. Herman	13a			Manasse Co., J.	10a	New Standard Co., (Inc.)	18a	Orbital Gas Engine Co.	2a	Penn Smelting and Refining Co.	14a	Reckhart, D. W.	15a	Shaw, Willis	4a	Thompson & Boyle	12a	Van Wagenen, Theo. F.	5a	Weber & Co., F.	8a	Young & Sons	6a				
																Irving & Co., Jas.	8a	Quick, John W.	12a	Kohlbusch, Sr. Herman	13a			Manasse Co., J.	10a	New Standard Co., (Inc.)	18a	Orbital Gas Engine Co.	2a	Penn Smelting and Refining Co.	14a	Reckhart, D. W.	15a	Shaw, Willis	4a	Thompson & Boyle	12a	Van Wagenen, Theo. F.	5a	Weber & Co., F.	8a	Young & Sons	6a				
																Irving & Co., Jas.	8a	Quick, John W.	12a	Kohlbusch, Sr. Herman	13a			Manasse Co., J.	10a	New Standard Co., (Inc.)	18a	Orbital Gas Engine Co.	2a	Penn Smelting and Refining Co.	14a	Reckhart, D. W.	15a	Shaw, Willis	4a	Thompson & Boyle	12a	Van Wagenen, Theo. F.	5a	Weber & Co., F.	8a	Young & Sons	6a				
																Irving & Co., Jas.	8a	Quick, John W.	12a	Kohlbusch, Sr. Herman	13a			Manasse Co., J.	10a	New Standard Co., (Inc.)	18a	Orbital Gas Engine Co.	2a	Penn Smelting and Refining Co.	14a	Reckhart, D. W.	15a	Shaw, Willis	4a	Thompson & Boyle	12a	Van Wagenen, Theo. F.	5a	Weber & Co., F.	8a	Young & Sons	6a				
																Irving & Co., Jas.	8a	Quick, John W.	12a	Kohlbusch, Sr. Herman	13a			Manasse Co., J.	10a	New Standard Co., (Inc.)	18a	Orbital Gas Engine Co.	2a	Penn Smelting and Refining Co.	14a	Reckhart, D. W.	15a	Shaw, Willis	4a	Thompson & Boyle	12a	Van Wagenen, Theo. F.	5a	Weber & Co., F.	8a	Young & Sons	6a				
																Irving & Co., Jas.	8a	Quick, John W.	12a	Kohlbusch, Sr. Herman	13a			Manasse Co., J.	10a	New Standard Co., (Inc.)	18a	Orbital Gas Engine Co.	2a	Penn Smelting and Refining Co.	14a	Reckhart, D. W.	15a														

## Crude Platinum Purchased.

To Identify Crude Platinum when found, send 75c for Sample in glass, packed in a strong box. We purchase or refine anything containing Platinum.

## BAKER &amp; COMPANY.

NEW YORK OFFICE: 120 Liberty Street.

NEWARK, NEW JERSEY

## J. W. McCOY,

## Consulting Mining Engineer,

1202 Owings Building, Chicago, Ill.

Examinations and Reports on Mining Properties

**\* SCHOOL OF \***  
Practical Mining, Civil, Mechanical,  
Electrical Engineering, Metallurgy,  
Cyanide Process, &c.  
Surveying, Architecture, Drawing and Assaying.  
933 MARKET ST. SAN FRANCISCO, CAL.  
OPEN ALL YEAR  
A. VAN DER NAILLEN, President.  
Assaying of Ores, \$25; Bullion and Chlorination  
Assay, \$25; Blowpipe Assay \$10. Full Course  
of Assaying, \$50. Established 1864.  
Send for Circular

## AL-- WEBER Hoist is always --AL.

And they Always Give Satisfaction

The Buena Vista Smelting & Refining Company,  
B. F. MORLEY, Manager.

BUENA VISTA, COLO. Sept 13-1898.

Weber Gas &amp; Gasoline Engine Co.,

Kansas City, Mo.

Gentlemen:-

Replying to your favor of the 12th inst: I have not time to  
write an extended letter. You may, however, quote me as saying that the  
hoist is A 1 in every respect, and entirely satisfactory.

Yours truly,

The Buena Vista S. &amp; R. Co.,

B. F. Morley

MGR.

Runs on Gasoline, Distillate or Kerosene, Sizes 4 to 100 H. P.

Get our New Catalogue—Tell us your requirements and we will save you  
some money Hoisting or Pumping or Running any  
kind of Machinery.

The Weber Gas and Gasoline Engine Co.

434 S. W. Boulevard,  
Kansas City, Missouri.

Established 1872.  
**F. E. BRANDIS, SONS & CO.**  
ENGINEERING  
**INSTRUMENTS**  
-FOR ALL PURPOSES.  
812-814 GATES AVE., BROOKLYN, N. Y.  
Catalogues mailed on application.

**Theo. F. Van Wagenen, E. M.**  
CONSULTING, MINING and  
HYDRAULIC ENGINEER.  
P. O. Box 83, BOISE, IDAHO.

**George Gordon McNamara**  
Consulting Mining Engineer  
and Metallurgist

Bedford McNeill Code Florence, Arizona

**Horace F. Brown, M. E.**

Mechanical Roasting, Cooling and  
Conveying of Ores. Automatic  
milling plants adapted to  
standard processes.

699 Washington Boulevard CHICAGO, ILL.



## Engineers' and Draughtsmen's Supplies

Sole agents for Riefler's round system drawing  
instruments and Albert Ott's Planimeters,  
Planimeters and other instruments of precision.  
Levels and transit of superior make.

F. WEBER &amp; CO. PHILADELPHIA

E. E. BURLINGAME & CO.,  
ASSAY OFFICE AND CHEMICAL LABORATORY

Established in Colorado, 1866. Samples by mail or  
express will receive prompt and careful attention.  
Refined, Melted and Assayed  
Gold & Silver Bullion  
Concentration Tests  
100 lbs. or car load lots.  
Write for terms.  
1736-1738 Lawrence St., Denver, Colo.

**Chas. S. McKelvey,**  
ATTORNEY AT LAW

Mines and Mining Law a Specialty

505 Bullard Block, Los Angeles, Cal.

**The CALIFORNIA ANTI-CALORIC COMPANY**  
Steam Pipe and Boiler Covering

Manufactured under our own Patents and solely from California Products.

ANTI-CALORIC PLASTER; the best and cheapest Insulating  
Plaster in the Market.

Factory, Potrero Tel. Main 5752 OFFICE: 217-219 Mission St., San Francisco



# CHAS. C. MOORE & CO.

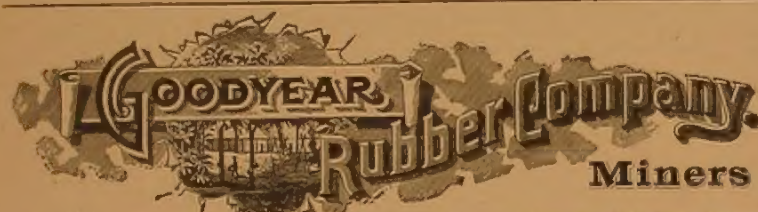
ENGINEERS AND DEALERS IN

BABCOCK & WILCOX BOILERS, GREEN'S ECONOMIZERS, WHEELER CONDENSERS,  
McINTOSH & SEYMOUR ENGINES, BARNARD-WHEELER COOLING TOWERS,  
HAMILTON CORLISS ENGINES, HOPPE'S LIVE STEAM PURIFIERS,  
N. Y. SAFETY AUTOMATIC ENGINES,  
GOUBERT FEED WATER HEATERS, EDMISTON FEED WATER FILTERS,  
STRATTON STEAM SEPARATORS, BUNDY STEAM TRAPS,  
SNOW STEAM PUMPS, SPENCER DAMPER REGULATORS,  
QUIMBY SCREW PUMPS, HYATT ROLLER BEARINGS.

Watch this Space for description of the above Machinery.

Send for Catalogue and Full Information.

32 First Street, San Francisco, Cal.



GATHERING RUBBER, Crack Proof Boots, White Rubber Coats, Oil Clothing

BELTING, PACKING AND HOSE

573, 575, 579 Market Street,  
SAN FRANCISCO, CAL.

R. H. PEASE,  
Vice President and General Manager.

73 and 75 First St.  
PORTLAND, OREGON

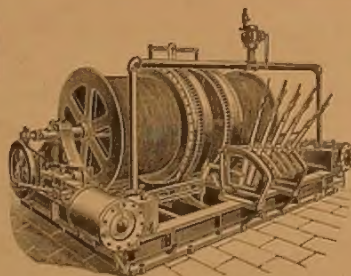
GOODYEAR'S

RUBBER GOODS

— FOR —

Miners and Mining

## Lidgerwood Hoisting Engines



Built to gauge on the Duplicate  
Part System. Quick Delivery Assured.

HENSHAW, BULKLEY & CO., Agents, San Francisco,

New York

## Mine Hoists,

STEAM AND ELECTRIC

CABLEWAYS Hoisting and Conveying Devices

SEND FOR CATALOGUE

Lidgerwood Mfg. Co.

96 Liberty Street,

## Metcalf, Thomas & Co., INVESTMENT & MINING BROKERS

Official Agents of the Black Hills Copper Co., Ltd.

OF JEROME ARIZONA.

LONDON AGENCY: Suffolk House  
Cannon St., E. C., London, England.

224 DOUGLAS BLOCK,

Cable Address, METCALF.

LOS ANGELES, CAL.

## LINK-BELT Elevators and Conveyors



Coal Conveyor, 325 ft. center  
handling 4 tons run of  
mine coal per minute

Electric Coal Mining and Haulage  
Machinery.

Complete Tipple-house equipment, Coal  
Washing Machinery, Shafting, Pul-  
leys, Shaft Bearings, Friction  
Clutches, Gearing, etc.

SEND FOR CATALOGUE

The Link-Belt Machinery Co.

ENGINEERS, FOUNDERS, MACHINISTS

CHICAGO, U. S. A.

DENVER:

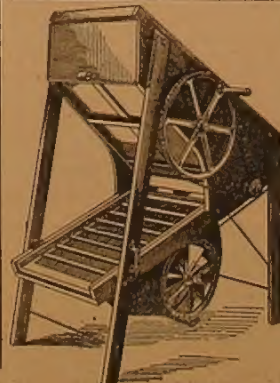
1328 17th Street

A. E. LINDROOTH, Manager

BUY

ANTIMONY ORES AND  
CRUDE ANTIMONY

WRITE FOR FULL PARTICULARS



## The Mait Dry Gold Saver...

The only thoroughly practical DRY WASHER  
ever invented, will save a larger per cent. of  
gold than any other machine. It is Cheap,  
Light and Durable.

The material used in its construction is of  
the best, well bolted and screwed (not nailed)  
together. Woodwork, spruce; lining, galvan-  
ized iron; riffle screen, No. 70 mesh, brass wire.

Small size \$35, medium size \$40, large size \$50.

A. G. GODFREY, Manufacturer,

206 S. Los Angeles St. Los Angeles, Cal.

## EUGENE DIETZGEN CO.

181 MONROE STREET, CHICAGO,  
149-151 Fifth Ave., New York, N.Y.

MANUFACTURERS AND IMPORTERS OF  
ENGINEERING and  
DRAWING INSTRUMENTS  
of every description.  
We carry Largest Stock in the West.  
New 224 PAGE ILLUSTRATED  
CATALOGUE sent on application



## Reliable Assays

Gold ..... \$ .50 Gold & Silver ..... .75  
Lead ..... .50 Gold, Silver, & Copper, 1.50  
Samples by mail receive prompt attention.

RICH ORES AND BULLION BOUGHT

OGDEN ASSAY CO.,

1429-16th Street,

Denver, Colo.



## MACHINERY

NEW AND 2ND HAND  
FOR SALE CHEAP

Hoisting Engines, Air Com-  
pressors, Rock Drills, Crushers,  
Dump Cars, Steam Shovels,  
Light Locomotives, Relaying  
Rail, etc. Send for printed leaf-  
let just issued.

WILLIS SHAW, 629 N.Y. Life Bldg., CHICAGO

I. C. YAWGER,

VICTOR BISHOP & CO.



21 Maiden Lane, - - - - - New York

## MATHISON & CO.

25-27 CEDAR ST.,

NEW YORK CITY

## ANTIMONY



# BOOKS ON MINING & METALLURGY.

A CAREFULLY SELECTED LIST OF STANDARD WORKS FOR PRACTICAL MINERS, METALLURGISTS,  
MINING ENGINEERS AND METAL MANUFACTURERS

**A Handbook of Metallurgy.** By Carl Schnabel, translated by Henry Louis, two volumes, illustrated, medium 8vo.....\$10.00 net.  
Vol. I.—Copper, Lead, Silver, Gold. Vol. II.—Zinc, Cadmium, Mercury, Bismuth, Tin, Antimony, Arsenic, Nickel, Cobalt, Platinum, Aluminum.

The German original is acknowledged to be the best existing work on the subject; and this new translation has the advantages of being well up to date as to its facts and absolutely modern in its descriptions of methods of treatment, etc.

The translators name has long been connected with mining and kindred subjects through his book on "Gold Mining."

**A Manual of Practical Assaying.** By H. Van F. Furman. Fourth edition with five Appendices on most recent methods, 8vo, cloth.....\$3.00  
Contents.—Part I. Introductory. Part II. Determinations. Part III. Special Assays and Analyses. Part IV. Calculations.

**Cyanide Processes for Gold and Silver Ores.** By E. B. Wilson, E. M., 12mo, cloth.....\$1.50  
Contents: Introduction—Chapter I. Stamp mill-work; II. Amalgamation; III. Foundation of Cyanide Process; IV. Chemistry of the Operation; V. Leaching the Ore; VI. Zinc as a Precipitant; VII. Treatment of Bullion; VIII. The Recovery by the Cyanide Process; IX. Laboratory Work; X. Gold and Silver Solvents Combined with Electrical Action; XI. Cyanide Solution with various Electrodes; XII. The Current; XIII. Anodes; XIV. Cathodes; XV. Various Processes and Conclusions; Authorities; Useful Information.

**Notes on Assaying.** By P. De Peyster Ricketts, E. M. Ph. D. and Edmund H. Miller, A. M. Ph. D. 8vo, cloth.....\$3.00

Prepared with special reference to the wants of the student and practical assayer. Containing also instructions for laboratory tests by Cyanide, Chlorination, Russell Process, etc., Assayers' Oath, Rapid Volumetric Methods for the Analysis of Ores, etc.

**The Alloys and their Constituents.** By Prof. Robt. H. Thurston, Cornell University. Second edition, 8vo, cloth.....\$2.50  
Copper, Tin, Zinc, Lead, Antimony, Bismuth, Nickel, Aluminum, etc.; The Brasses, Bronzes, Copper-Tin-Zinc Alloys; Other Valuable Alloys; Their Qualities, Peculiar Characteristics; Uses and Special Adaptations: Thurston's "Maximum Alloys"; Strength of the Alloys as Commonly made and as affected by Special conditions; The Mechanical Treatment of Metals.

**Notes on the Treatment of Gold Ore.** By Florence O'Driscoll, 8vo, cloth.....\$2.00

"It is an interesting discussion of the properties of gold, its occurrences, the methods of procedure in mining in late years, with the losses incident thereto and remedies for the same. The main object in presenting the work has been to make clear a few misconceptions on the subject, the most fatal of these being that any one method of treatment is efficacious in dealing with all classes of gold ores."—*American Manufacturer*.

**The Chlorination Process.** By E. B. Wilson, E. M., 12mo, cloth.....\$1.50  
Contents: Lixivation by Chlorine Solutions; Preparation of the Ore-Roasting Furnaces; The Leaching Process; Filtering; Precipitation; Refining the Precipitates; Resume of Chlorination and Plant, Cost of Chlorination.

**Metallurgy of Silver, Gold, and Mercury in the United States.** By Prof. Thos. Egleston, School of Mines, Columbia University. With corrections. Vol. I.—Silver. 8vo.....\$7.50  
Showing the latest practice pursued in American Metallurgical Establishments. With 186 engravings and folding plates, tables, etc.

Vol. II.—Gold, Mercury, etc. Illustrated with 140 engravings and folding plates, 935 pages, 8vo, cloth.....\$7.50  
These treatises cover the whole range of the metallurgy of silver, gold and mercury in this country; and in a clear, pleasing and interesting manner conveys information of exceeding value to all in any manner interested in the production of these precious metals.—*Engineering News*.

**Iron and Steel.** By Prof. Robt. H. Thurston, Cornell University. Sixth Edition, revised 8vo, cloth.....\$3.50

The Ores of Iron; Methods of Reduction; Manufacturing Processes, Chemical and Physical properties of Iron and Steel; Strength, Ductility, Elasticity, and Resistance; Effects of Time, Temperature and Repeated Strain; Methods of Test; Specifications.

"Should be in the hands not only of all Engineers but of all Mine owners and Metallurgists as well."—*Mining Review*.

**The Coal Mines of the Western Coast of the United States.** By W. A. Goodyear. 12mo, cloth.....\$2.50

**Practical Mine Ventilation.** By E. B. Wilson, M. E. Fifth edition with plates, 16mo, cloth.....\$1.25

For the use of Mining Engineers, Students and Practical Men.

"We recommend it heartily to our Mining community."—*Colliery Guardian (London)*.

**Hydraulic and Placer Mining.** By E. B. Wilson, M. E. 12mo, cloth.....\$2.00  
Contents: Uses of Water in Mining, Geology of Placer Deposits, Gold Recovery by various methods, Panning, Cradles, Long Tom, Boomling, Sluicing, Riffles, Flumes, Ditches, Dams, Pipes, Giants, Valves, Gates, Wiers, Miner's Inch, Pressure Box, Dams Gravel Elevators, Exploiting, Dredging Rivers, Traction Dredgers, Appendix containing Location of Claims and General Information.

**The Modern High Explosives—Nitro-Glycerine and Dynamite.** By Manuel Bissler, Mining Engineer. With many illustrative plates. Third edition, 8vo, cloth.....\$4.00

Their Manufacture, their Use and their Application to Mining and Military Engineering; Pyroxyline or Gun Cotton, the Fulminates, Picrates, and Chlorates; also, the Chemistry and Analysis of the Elementary Bodies which enter into the Manufacture of the principal Nitro Compounds.

**The Ventilation of Mines.** By J. T. Beard, C. E., E. M., Secretary of the State Board of Examiners for Mine Inspectors, Iowa. 12mo, cloth.....\$2.50  
Designed for use in Schools and Colleges and for practical mining men in their study of the subject.

**Manual of Mining.** By Prof. Magnus C. Ihseng, E. M., Ph. D. Third edition, revised and enlarged, 8vo, cloth.....\$4.00

For the use of Mining Engineers and Technical Schools. Treating of Preparatory and Exploratory Work, Methods of Mining, Hoisting Machinery, Pumping, Ventilation Shafts, Tunnels, Blasting, Timbering, etc.

The text has been increased by more than fifty pages in order to introduce additional matter pertaining to the design of cars, hoisting appliances and fans.

**Catalogue of American Localities of Minerals.** By E. S. Dana. Reprinted from sixth edition of the System. 8vo, cloth.....\$1.00

**A Description of Minerals of Commercial Value.** By D. M. Barringer, A. M., LL. B. 168 pages, Oblong, morocco binding.....\$2.50

A Practical Reference Book for the Miner, Prospector and Business Man, or any Person who may be interested in the Extraction or treatment of the Various Metallic or Non-metallic Minerals and for Students either in Field-work or Laboratory.

**An Introduction to the Study of Metallurgy.** By W. C. Roberts Austen, C. B., F.R.S. New Fourth Edition, Revised and enlarged. With 90 illustrations. Crown octavo. Cloth.....\$5.00

For those who are beginning to study Metallurgy this work is a desirable guidance to a knowledge of the principles by which the art is rightly practiced. The author treats the subject as a whole, giving no minute descriptions of processes, but choosing typical appliances and indicating their use in connection with groups of metals.

"No English text-book at all approaches this in the completeness with which the most modern views on the subject are dealt with."—*Chemical News*.

**The Metallurgy of Iron.** By Thomas Turner, Associate of the Royal School of Mines. Illustrated by 80 engravings, octavo, 381 pages, cloth.....\$5.00

This book is primarily intended for persons who are connected with the manufacture of iron and steel, and who may be assumed to have already some general knowledge of the subject discussed. At the same time the volume may not be without interest to others than those for whom it was specially prepared.

"A most valuable summary of useful knowledge relating to every method and stage in the manufacture of cast and wrought iron. An exhaustive and really needed compilation."—*Bulletin of the American Iron and Steel Association*.

**A Treatise on Mine-Surveying.** By B. H. Brough, Associate of Royal School of Mines. With 102 illustrations. Octavo. 340 pages, Cloth.....\$2.50

The work is intended primarily for students; and, at the same time, it will also be found useful as a companion to the standard works of reference on land-surveying. The methods of surveying in the Pennsylvania anthracite mines are fully dwelt on, and the most recent forms of American instruments are described and illustrated. A description is also given of the methods adopted in the survey of metalliferous mine-claims in the Western United States.

"It is the kind of book which has long been wanted, and no English speaking mine agent or mining student will consider his technical library complete without it."—*Nature*.

**A Text-Book of Ore and Stone Mining.** By C. Le Neve Foster, B. A., D. Sc., F.R.S. With Frontispiece and 716 illustrations. Large Octavo, cloth.....\$10.00

A Text-book of ore and stone mining, for the use of mine owners, mine managers, prospectors and all interested in ore and stone mining.

"Mining engineering is at last adequately treated in this volume, and the different kinds of work that have to be done by the miner in the way of surveying, exploiting, drainage, ventilation, lighting, etc., as well as in the treatment of ores after their excavation, are all very fully treated. The book is adequately illustrated and excellently indexed. One section is devoted to legislation affecting mines and quarries, while another chapter is devoted to the condition of the miners, their modes of life, and the means for ameliorating their condition and elevating them."—*Scientific American*.

**Prospecting for Minerals.** A Practical Handbook for Prospectors, Explorers, Settlers and all interested in the Opening-up and Development of New Lands. By S. Herbert Cox. With illustrations. Large crown octavo.....\$2.00  
The object of this volume is to give a sketch of those subjects which underlie the calling of the prospector without encroaching to any great extent upon the provinces occupied by the sciences of mineralogy and geology or the arts of mining and metallurgy. To the practical prospector it may give certain hints as regards the recognition of minerals with which he is unacquainted, while to the student it may afford an introduction to the subject which will be of use in directing his work into the proper channels.

**The Metallurgy of Gold.** By T. Kirk Rose, B. Sc., Edited by Prof. W. C. Roberts Austen, C. B., F. R. S. Third edition, Revised, including the most recent improvements in the Cyanide Process, and a new chapter on Economic Considerations (Management, Cost, Output, etc.) With frontispiece and additional illustrations. Large octavo, handsome cloth.....\$6.50

Adapted for all who are interested in the gold mining industry, being free from technicalities as far as possible; of especial value to those engaged in the industry,—viz., mill-managers, reduction-officers, etc.

A feature is the description of exact methods employed in particular extraction works—Stamp-batteries of South Africa, Australia, New Zealand, California, Colorado and Dakota; Chlorination works, also, in many parts of the world; Cyanide works of South Africa or New Zealand. These accounts are of special value to practical men.

**Getting Gold.** A Gold-Mining Hand-Book for Practical Men. By J. C. F. Johnson; F. G. S., A. I. M. E. With illustrations. Crown octavo, cloth.....\$1.50

A compendium, in specially concrete form, of useful information respecting the processes of winning from the soil and after-treatment of gold and gold ore, including some original discoveries by the author. Practical information, original and selected, is given to mining company directors, mine managers, quartzmill operators, and prospectors.

**A Text-Book of Assaying.** By C. and J. J. Beringer. For the use of those connected with mines. Third edition. With numerous Diagrams and Index. Crown octavo, 400 pages. Cloth.....\$3.25

Prepared to meet the existing want of a practical "handy-book" for the assayer. The author has given the results of a series of experiments showing the effect of varying conditions on the accuracy of the process. Statements like those generally made, that "this or that substance interferes," are insufficient. It is necessary to know under what conditions and extent.

"A really meritorious work, that may be safely depended upon either for systematic instruction or for reference."—*Nature*.

**Blasting.** By Oscar Guttman, Assoc. M. Inst. C. E. A Hand-Book for the use of Engineers, and others engaged in Mining, Tunneling, Quarrying, etc.

With 136 illustrations. Octavo, cloth.....\$3.50

Mr. Guttman's "Blasting" is the only work on the subject which gives full information as to the new methods adopted since the introduction of dynamite, and, at the same time, the results of many years practical experience both in mining work and in the manufacture of explosives. It therefore presents in concise form all that has been proved good in the various methods of procedure.

**Elements of Metallurgy.** A Practical Treatise on the Art of Extracting Metals from their Ores. By J. Arthur Phillips, M. Inst. C. E., F. C. S., F. G. S., etc. With 238 illustrations, drawn to scale, and reduced in many instances from working drawings. Royal octavo, 909 pages, cloth.....\$9.00

Contents:—A Treatise on Fuels and Refractory Materials. A Description of the Principal Metalliferous Minerals, with their Distribution. Statistics of the amount of each Metal annually produced throughout the world, obtained from official sources, or, where this has not been practicable, from authentic private information. The Methods of Assaying the different Ores, together with the Processes of Metallurgical Treatment, comprising Iron, Cobalt, Nickel, Aluminum, Copper, Tin, Antimony, Arsenic, Zinc, Mercury, Bismuth, Lead, Silver, Gold and Platinum.

**Tables for the Determination of Minerals.** By Physical Properties ascertainable with the Aid of a few Field Instruments. By Percival Frazer. Fourth edition, to which 140 additional species have been added. 12mo, cloth.....\$1.50  
The purpose of this book is to aid the student in determining minerals by their physical properties as distinguished from the chemical reactions which they give. That it is possible so to manage tables that it shall be in the main possible by their use, for the student to determine a mineral from its color, lustre, streak, hardness, crystalline form, and cleavage, has been shown by the reception which this book has had through its various editions."—*New York Science*.

**Electric Smelting and Refining.** A Practical Manual of the Extraction and Treatment of Metals by Electrical Methods. The "Elektro-Metallurgie" of Dr. W. Borchers, translated by Walter G. McMillan, F. I. C., F. C. S. With numerous illustrations and folding plates. Large octavo.....\$6.50

Dr. Borchers's treatise is practical throughout. It confines itself to one branch of electro-chemistry,—viz., electrolysis, a subject which is daily becoming of more and more importance to the practical metallurgist and manufacturer. In the extraction of Aluminum, the refining of copper, the treatment of gold and other metals, electrical processes are fast taking the place of the older methods.

"Dr. Borchers's well-known work . . . must of necessity be acquired by every one interested in the field. It is excellently put in English, with additional matter by Mr. McMillan."—*Science*.

**The Story of American Coals.** By William Jasper Nicolls, M. Am. Soc. C. E. Buckram, gilt top, deckle edges, with complete index.....\$3.50

"It is as much historical as scientific, and scientific without being at all technical. The author, Mr. Nicolls, has adopted a pleasing simple style of writing which causes the reader to be loath to lay the book down until it is finished."—*Phila. Ledger*.

Sent Post Paid to any address on receipt of Price.

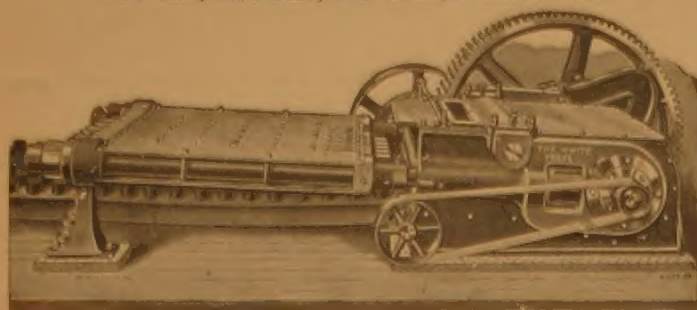
We will endeavor to secure, for subscribers and customers, any other book on Mining, Metallurgy and kindred subjects.

Address, Book Department, THE MINING and METALLURGICAL JOURNAL, 32 Broadway, New York City.



## The White Briquetting Press

FOR COAL, FINE ORES, FLUE DUST, CONCENTRATES



SOLE LICENSEES TO SELL AND OPERATE

**The Henry S. Mould Company,**

Carnegie Building

PITTSBURG, PA., U. S. A.

TRADE MARK



McARTHUR-FORREST PROCESS

## CYANIDE PROCESS

**The McArthur-Forrest Cyanide Process**  
IS THE BEST

For the Treatment of Refractory and Low Grade Gold and Silver Ores and Tailings. We are the Originators of the Cyanide Treatment, and have kept up with the times in all improvements in Cyanide Methods.

Successful Plants in Operation in all Western Mining States. Samples Assayed and Fully Reported upon. Properties Examined. Designs furnished. For Terms and Particulars, Address

**THE BOLD AND SILVER EXTRACTION CO., of America, Ltd.**  
OEO. A. ANDERSON, General Manager

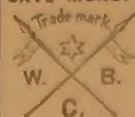
Testing Works: 1716 Blake St., Denver, Colo. 208-210 McPhee Building, Denver, Colorado.  
JESSE J. McDONALD, Agent. 127 W. First St., Los Angeles, Cal.

## YOUNG & SONS.,

Manufacturers of

Engineering, Mining and Surveying Instruments. Noted improvements in Auxiliary Telescopes for vertical sighting in mines. Makers of the inclined standard transit. Non-Extension Telescopes, moisture and dust proof. Write for special circulars of mining transit. 43 N. Seventh St., Philadelphia Penn.

SAVE MONEY!



FUEL COSTS MONEY

Protect your pipes and boilers with Wm. Berkefeld's Fossil meal composition, packed in sacks, easy to transport anywhere. Send for facts and figures.

FOSSIL MEAL CO.,  
3 Cedar Street, New York

**Lew E. Aubury,**  
Mining Engineer,

ASSAY OFFICE,

115 W. First Street,

Los Angeles, Cal.

## Mining Supplies and Steel

**Blacksmiths and Machinists Supplies of all kinds.**

Iron and Heavy Hardware, Wood Materials, Wheels, Hardware &c., for heavy freight wagons. Blacksmiths and Wagonmakers Tools and Machines. Send for complete catalogues.

**S. D. KIMBARK,**

80-82-84 Michigan Ave.,

Chicago, Ill.

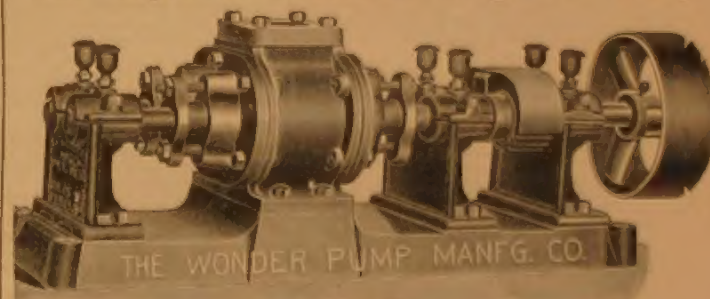
## SIMONDS & WAINWRIGHT,



Chemical and Mining Engineers  
Assayers and Analysts

159 Front Street, New York

## The Improved WONDER Irrigation Pump



We also Build Vertical Style for Mining Purposes.  
Write for full particulars and Catalogue.

**Wonder Pump Mfg Co.,**

**LEAVENWORTH,**  
Kansas.

MACHINERY & ELECTRICAL CO., Los Angeles, Cal., Agents for California.

**WEIS & GIBSON,**  
Assayers and Analytical Chemists

51 Clark St, Chicago, Ill.

Assays and analyses of all kinds. Mail orders promptly attended to. Mining properties examined and reported upon. Terms on application.

**Assay Office and Ore Testing Laboratory**

OF HENRY E. WOOD, Assayer

1734 ARAPAHO ST., DENVER, COLORADO

Established in Colorado in 1888

Control and Empire Assays a Specialty. Wilfley Concentrator in Operation. Write for circular giving prices, etc.

## The Bleichert Wire Rope Tramway

And Other Systems of Aerial Transportation



Bleichert Tramway of the Solway Process Co transporting rock

MANUFACTURED BY **THE TRENTON IRON CO.,** TRENTON, N. J.

Engineers and Contractors, and sole licensees in North America for the Bleichert System. Also Wire Rope Equipments for Surface and Underground Haulage, etc.

NEWTON D. BELL, Agent,

308 Market St., San Francisco, Cal.

## FULTON ENGINE WORKS

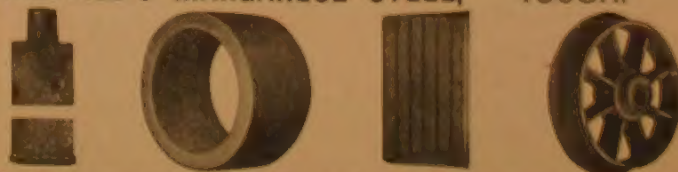
Mining, Milling & Smelting Machinery

Estimates Furnished on all Classes of Mining Work

P. O. Box 296, STATION "C"

LOS ANGELES, CALIFORNIA

## HADFIELD'S MANGANESE STEEL, HARD, TOUGH.



Best Metal known for Stamp Shoes and Dies, Roll Shells, Crusher Plates and Slide Liners. Toggles and Tugger Bearings, Gyroscopic Cones and Concaves or Liners, Mine Car Wheels, Coal Crushing Rolls, Etc., Etc.

**TAYLOR IRON AND STEEL CO.,**

Sole Licensees in America under Hadfield system and Patents. High Bridge, N. J., U. S. A.  
All Pacific Coast parties interested please address, Fulton & Lacy Co., San Francisco, Cal.







der. The aggregate railway mileage of the country has now reached the enormous total of 191,000, by far the greatest of any country in the world. Of the several States, Illinois comes first in number of miles, with Pennsylvania and Texas second and third respectively.

#### PRODUCTION OF GOLD AND SILVER,

The Director of the United States Mint reports the total gold production in the United States in the calendar year 1899 of \$70,694,170, an increase over last year of \$6,249,670. The production of silver is estimated at \$74,423,606, an increase of \$4,040,211.

#### THAWING DYNAMITE.

The Oregon Agricultural College and Experimental Station announce the discovery of a process for thawing dynamite with perfect safety. By burying dynamite in fermenting horse manure, for one or two hours, before using the element of danger in thawing out that explosive is removed.

Miners need not place material over the boiler in the mill, or under the stove in their cabin to prepare frozen dynamite for use in future.

#### MONETARY BILLS IN CONGRESS.

The House of Representatives has passed the Caucus bill of the majority party without amendment. The bill of the Senate Finance Committee differs in some not very material particulars from that which has passed the House.

So far as appears the administration members of neither the Senate nor the House have come up to the full measure of the recommendations of Senator Gage. Whether they believe with him or not they have not dared to go to the full extent of his recommendations. What they may be induced to do future developments will disclose.

The House bill first declares for the gold standard, and makes all the public bonds payable in gold, both interest and principal. The law under which they were issued requires that they shall be payable in coin, and the agreement in the bonds is to pay in coin.

In the second place, the bill requires that the United States notes (greenbacks) and the treasury notes, issued under the Sherman act of 1890, shall be redeemed in gold, and when taken in they shall not be reissued except in exchange for gold. This means a practical retirement of those two classes of government paper from circulation, for besides those received for duties and taxes and from miscellaneous sources, the banks will be interested to sort and present them for redemption. It will be rare that gold will be taken to the treasury to exchange for those notes.

Thirdly, the bill authorizes the Controller of the Currency to issue to the banks circulation to the par of their deposited bonds instead of ninety percent as under the present law, and the establishment of banks in towns of 2,000 population with a capital of \$25,000. These two features are preparatory to turning over to the banks the furnishing of all the paper currency.

Fourthly, the bill forbids the issuance after its passage any United States or treasury notes of less denomination than ten dollars, and the issuance of any silver certificates above the denomination of ten dollars.

Fifthly, it does not repeal the law which re-

quires the coinage from the bullion in bank 1,500,000 silver dollars per month, but it provides that as fast as coined and certificates are issued thereon the treasury notes *pro tanto* shall be canceled, it being the intention that there shall be no increase of the money volume from the coinage of silver dollars. Indeed, no provision is made for such increase except through the coinage of gold and fractional silver pieces, and through the action of the banks. It cannot be calculated that our gold mines will produce for coinage more than \$40,000,000 per annum. The increase of money demanded by the growth of our commerce is put at \$100,000,000. How liberal the banks will be in taking out circulation can only be conjectured. As their notes have to be redeemed in gold or its equivalent, it is certain that they will take good care not to run beyond their gold resources, and as the gold stock of the country fluctuates, their note issues will fluctuate, but not to meet the ever changing demand for money.

The House bill having gone to the Senate, that body has the whole money question before it, and its debates will be watched with the deepest interest by the country. Doubtless the Senate bill, whatever it may be, will be contested with desperate energy. It will be discussed as in fact a campaign issue.

Recent events may have a deterring influence on the Senators of the majority party. Secretary Gage has been forced to reluctantly admit that there is not sufficient money in the country to supply the wants of business. That fact has been apparent to many observant and intelligent men for several years. While the commerce of the country has been growing the government has been urging and producing contraction.

The recent flurry in New York and Boston, which required the issuance of clearing house certificates which is not warranted by law, have had a disquieting effect. In addition, gold has commenced to go out of the country in considerable sums, which has a discolored effect upon Mr. Gage's florid calculations. The tremendous expense of the South African war has had a depressing effect upon British finances, and as the mines at Johannesburg are yielding nothing now to the British gold stock, the Bank of England finds it necessary to send to this country for supplies.

Balances of trade in our favor have naturally fallen off through the decrease of the demand for breadstuffs and provisions in foreign countries. The future, so far as gold is concerned, is not as bright as it has been, and it will become the Senate to consider the money question with the utmost care.

#### THE METALLURGY OF GOLD.\*

BY L. J. STABLES.

##### THE OCCURRENCE OF GOLD.

We may sum up the teachings of Geology in reference to the origin and distribution of gold in the following statements.

First: Gold is found in the oldest known rocks, and its original position must have been in great depths in the earth.

Second: In the changes these rocks passed through, the gold has been concentrated into segregated quartz veins by some unknown process.

Third: Gold is found in fissure veins of all geological ages. It was deposited from hot

chemical solutions which leached various deeply buried rocks, gathering from them gold with other metallic minerals.

Fourth: In the course of ages, the strata containing auriferous veins was disintegrated, which produced the sedimentary rocks and the placer deposits.

Gold is to be looked for in granite regions, and in those rocks and gravels which have their origin in such regions.

The prospector should have knowledge of the geology of a region before he should begin the search for gold. The prospector should examine every ironstone "blow out" with care. According to the German saying, "the iron hat covers the golden head," or, as the Cornish man puts it, "iron rides a good horse."

The most important minerals containing gold are:

Sylvanite or graphite tellurium (Ag. An) Te, containing 24 to 26 per cent of gold.

Calaverite, containing 42 per cent of gold, has been found in Calaveras County, California.

Nagyagite, or foliate tellurium, 5 to 9 per cent of gold.

The minerals usually called auriferous are very numerous. The most important of these are iron pyrites and galena. The iron pyrites is the largest source of gold next to the native metal.

A native amalgam of gold is found in California, but not in large quantities.

Gold occurs free and in chemical combination. It is found in veins, in rock formations, and in the alluvial deposits of many river beds. When present in the rock formation in visible grains, it has sharp angles and usually not distinctly crystalline, it penetrates the rock directions, and is completely interwoven and attached to the matrix. The matrix is usually quartz, and is interwoven with slaty or schistose rocks. Gold sometimes occurs in small quantities in granite, gneiss and limestone.

Placer gold occurs in small scales, rounded grains and in larger masses, or nuggets. The difference in appearance between placer gold and vein gold lies in the fact that the former has rounded edges and the latter sharp edges.

##### CHARACTERISTICS OF GOLD.

Gold slowly melts at 2016 degrees Fahrenheit. When heated above this, it volatilizes. When passing from a liquid to a solid state, it contracts more than any other metal. Pure gold is the most malleable of the metals. It may be beaten into leaves that are 300,000 part of an inch in thickness. This same number of leaves of printing paper would make a pile 75 feet high. It is very ductile. A single grain has been drawn into a wire five hundred feet in length.

Gold alloys readily with most metals. The only alloys that find extensive use in the arts are those of copper and silver. Pure gold is very soft. Gold will weld cold. Thus foil and other forms can be used by the dentist as a filling material. The small particles are welded together into a homogeneous mass as the filling is inserted. In coin, it is alloyed with ten per cent of copper to give it hardness.

Silver and gold form useful alloys, the alloy is harder than either of the metals separately. Alloys of gold with lead are very brittle. Some of these alloys are as brittle as glass. A trace of lead will make gold brittle.

Metallic gold is not soluble in any single acid known to chemistry. Mixtures of HCl

\*A paper read before the Southern California Academy of Sciences, November 14, 1899, at Los Angeles, California.



and  $\text{HNO}_3$  will dissolve it, producing a chloride of gold. A number of reagents will precipitate it. Those usually used are sulphate of iron and oxalic acid.

#### THE SOURCES OF GOLD.

The supply of gold in the early ages came from nuggets. No expensive mining operations were necessary to secure it. The prospector simply picked it up. The largest nugget of gold ever found was at Ballarat, Australia. It weighed over 191 pounds and was 20 inches long and 9 inches wide. The value of this would be over \$50,000. Other nuggets found in Australia have weighed 135 pounds, 112, 106, 88.

In California, in Calaveras County, in 1854, a nugget weighing 160 pounds was found. In Sierra County, in 1869, one weighing 106 pounds. In Sierra County, 1871, one weighing 64 pounds. Many smaller nuggets have been found in North Carolina.

In looking for gold, the prospector should have an eye for color. Native gold has a peculiar color which is readily recognized. There are minerals that have the appearance of gold, such as iron pyrites and copper pyrites. The iron pyrites is often called "fools' gold." Any person can detect the difference between these minerals and gold by a few simple tests. Gold grains will always flatten when struck with a hammer, whereas other minerals resembling gold are brittle and will fly into many pieces. If the speck of gold is pricked with a pin, the genuine gold is pricked where the other minerals are scratched and show their brittleness. When gold is heated under the blow pipe, and is allowed to cool, it retains the original color. Any other minerals will turn black and not recover their original yellow color. The iron from iron pyrites will be attracted by a magnet, after heating with the blow pipe.

The next source of supply was from placer gold dust. California attracted the attention of the world when the very rich placer mines on Sutter Creek, Amador County, were discovered in 1848. Large pieces of gold were separated by washing in a pan.

#### METHOD OF OBTAINING GOLD.

These placers were recognized as the dry and the wet. The dry were ancient river beds from which the water was gone. This was separated from the sand by means of air currents, which was caused to blow away the sand and leave the heavier gold. Mechanical methods were next introduced, in which the difference in specific gravity between sand and gold was taken advantage of. One of these appliances was the "pan." It was used when water could be secured. The sand and clay were washed from the gold by giving the pan a circular motion, washing away the lighter particles, leaving the gold and concentrates in the bottom of the pan. Following the introduction of the pan came the cradle and "long tom."

The cradle resembles somewhat the shape of a child's cradle. The maximum capacity was five or six cubic yards a day. It took at least two men to operate it—one to shake the cradle, the other to shovel the dirt onto the screen and pour water upon it. The water washed the finer dirt through the screen where it settled on the bottom. This dirt was then panned and the gold collected. This was a very slow process, and required plenty of water and very rich dirt to make it pay.

The "long tom" was next introduced, and this was a very much improved machine over the cradle. It consisted of a screen,

amalgamated plates with riffles and a long sluice. Getting the amalgam out of the sluice is called a "clean-up." The time between one clean-up and the next is called a "run."

The shallow and very rich placers were worked at first. These were worked in a careless way with a large loss of gold. The "Forty-niners," as they are called, cared very little whether they got out all the gold or not. What was lost was of very little consequence, but what was gained in a day's work was of the greatest importance. He cared nothing for the world's future supply, but looked for immediate results.

Following these processes, involving sluices as described, came hydraulic mining. This process has added more to the wealth of California than all of the other processes of mining and metallurgy together. This is a process that involves large capital. It requires dams for the storage of water and the construction of ditches and pipes for carrying the water to the field of operation. The water when discharged through the iron nozzle has a velocity of 150 feet per second. The water flowing in twenty-four hours will amount to 4,220,000 cubic feet. This is discharged against a large bank, several hundred feet high, and washes the earth into the sluices where the gold is caught. To make the removal more effective, the banks are blasted frequently with charges of from 1,500 to 2,000 kegs of powder.

The gold is caught in mercury in the riffles. The great difficulty is not so much in catching the gold as in getting rid of the tailings. These tailings cover the land and fill the river beds, etc. This filling the rivers and flooding the country with boulders, has called forth special legislation to control hydraulic mining.

The loss of fine gold in these crude processes was large. This loss was overcome in part by adding mercury to catch the fine gold with which it was united to form amalgam. The sand was washed from the amalgam, after which it was heated to remove the mercury, leaving the gold and silver as bullion.

These ancient methods have been very much improved upon in the very best mill practice.

The ore is removed from a ledge by a tunnel passing into it, or by means of a shaft. The ore is brought to the mill, where it is crushed by stamps or rolls, and carried over amalgamated plates by means of water, the gold and silver is caught by the mercury, from which it is recovered by scraping from the plates the amalgam from which the gold and silver is recovered by heat. The ore, after it has passed over the plates, is called tailings. If all the gold the ore contained was free and in the metallic form, there ought to be no loss. If the gold is present in the sulphurets it will not amalgamate, but will be found in the tailings. In many base ores, the most of the gold is present in the sulphurets. If the tailings are examined carefully, particles of pyrites and sulphides of the base metals are found to be present. These heavier particles of pyrites, sulphides of base metals and gold can be removed with a current of water from the quartz, by virtue of their higher specific gravity. Many belt and table concentrating machines are on the market, and their principles are well known. These heavier particles are called concentrates and may be rich in gold. If the concentrates are examined with a microscope, no free gold can be detected, or if they are treated with mercury, very little if any will be extracted. When the concentrates are

treated with mercury, in many cases it will flour, and cause a large loss of mercury. This fact prevents the treatment of many ores profitably. The roasting removes the volatile constituents, such as sulphur, arsenic and antimony, leaving lead, zinc, iron and other metals in the form of oxides. The mercury will unite with some of these metals, and cause large loss by means of chemical union. Concentrates have been worked successfully by smelting. In the process of smelting, the gold and silver are collected in lead, and the lead is removed by crystallization and the last traces by cupellation.

In recent years, many concentrates and tailings have been worked by chemical processes. The processes calling our attention are:

- (1) Cyanide.
- (2) Chlorination.
- (3) Electro-chemical.

(To be Continued.)

#### GOODSELL'S PACKING.



WAX AND SEWED PUMP PACKING.

The Goodsell Packing Co., of Chicago, have issued their new catalogue for 1900. It is a neat 16 page and cover booklet, describing the different brands of Steam and other Packing manufactured and handled by this concern.

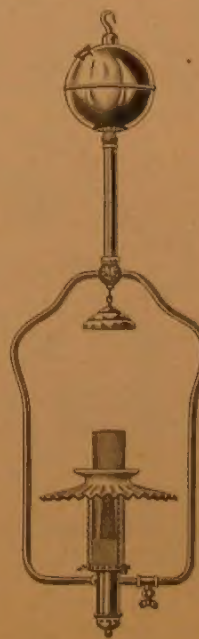
The brands are so well known and have given such universal satisfaction that any description of them here would be but repeating what had been said time and again before.

The capacity of pumping machinery is not only increased but maintained with Goodsell's "98" wax and sewed Pump Packing.

#### THE IMPERIAL GAS LAMP.

The Imperial Gas Lamp, which burns common stove gasoline, gives a beautiful, white light of 100 candle power and at a cost of one cent per day. The Imperial light is not affected by cold nor by wind and is in all particulars the most satisfactory light on the market. It is not an experiment, as thousands of them are now in use and giving the best results. The fixtures are ornamental and well made. There is no leak, no smoke and no odor. These lamps will take the place of candles in mines or any other light in and about a mill. Gasoline can be transported as easily as candles, and where it is used for power it is convenient for light.

Free particulars may be had by addressing The Imperial Gas Lamp Co., 132-134 Lake Str., Chicago, Ill.





# The Mining And Metallurgical Journal

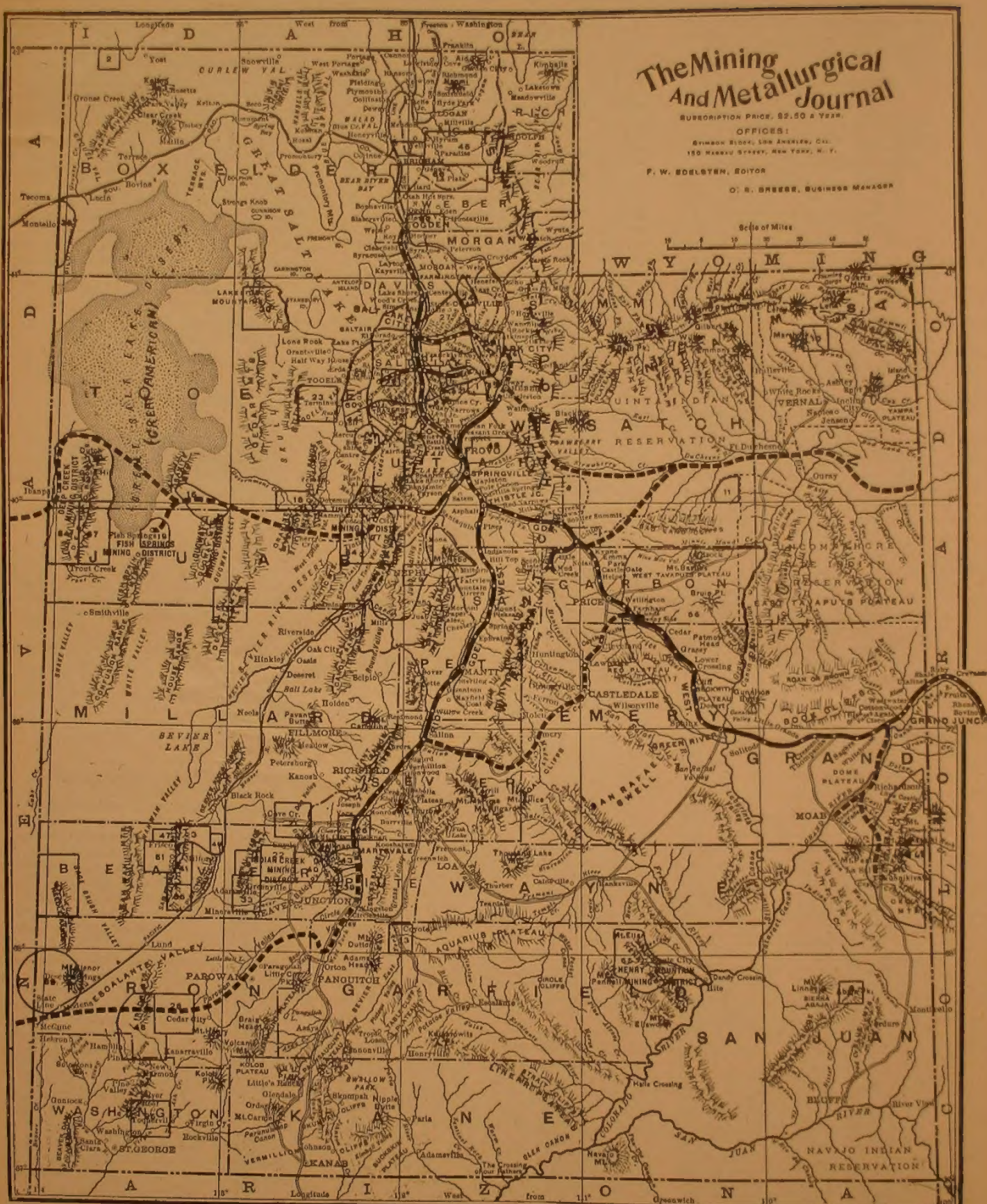
SUBSCRIPTION PRICE, \$2.50 A YEAR.

OFFICES:

STIMSON BUILDING, 130 N. WASHINGTON, CHICAGO, ILL.  
150 NASSAU STREET, NEW YORK, N. Y.

P. W. BOELSTEN, EDITOR

O. H. BREWER, BUSINESS MANAGER



## MINING DISTRICTS.

1. American Fork	NW	7. Box Elder	N	17. Emery	R	29. Juab	C	41. North Star	SW	(HOAN SILVER)	NC	61. W. Higgins	SW
2. Ashbrook	NW	8. Bradshaw	NC	18. Erickson	W	30. Lake Side	C	42. North Tintle	SW	62. Silver Lake	NC	62. Weber	SW
3. Beaver Lake	SW	9. Camp Floyd	NC	19. Fish Springs	W	31. Leamington	NC	43. Ohio	SW	63. Snake Creek	NC	63. West Mountain	NC
4. Big Cottonwood	NC	(MERCUR)		20. Gold Mountain	SW	32. Lehi	NC	(MARYSVILLE)	NC	64. Spring Creek	NC	64. (BROHAM)	
5. Blue Ledge	NC	10. Carbonate	NE	21. Gordon	SW	33. Lincoln	SW	44. Ophir	NC	(DEEP CREEK)	NC	65. West Tintle	C
6. Blue Mountain	SW	11. Castle Peak	H	22. Granite	SW	34. Little Cottonwood	NC	45. Paradise	SW	66. Star	SW	65. White Canyon	S
		12. Clifton	W	23. Grantsville	NC	35. Lower Placer	NC	46. Pinto Iron	SW	67. Tidwell Rideout	SW	(HONEY MOUNTAINS)	NC
		(DEEP CREEK)		24. Hard Scrabble	NC	36. Lucin	NC	47. Provo	SW	68. Tintle	NC	66. Willard	NC
		13. Coyote	SW	25. Harriaburg	SW	37. Mountain Lake	NC	48. Provo	SW	69. Tooele	NC	67. Willow Springs	W
		14. Detroit	SW	26. Henry	SW	38. Mt. Baldy	SW	49. Rocky	SW	70. Uintah	NC	(DEEP CREEK)	NC
		15. Dugway	NC	27. Hot Springs	NC	39. Mt. Nebo	SW	50. Rush Valley	NC	(PARK CITY)	NC	68. State Line	SW
		16. Elkhorn	NC	28. Iron Springs	SW	40. Newton	SW	51. San Francisco	SW	60. Utah	C	69. La Sal	SW



## THE MINING DISTRICTS OF UTAH.

(Continued from our issue of Jan. 1, 1900.)

## MARYSVALE.

About twenty-five years ago the Ohio district, or what is known now as Marysville, was first discovered. It consists of a wonderfully mineralized region containing mines of gold, silver, lead, copper and quicksilver. The district lies about 160 miles east of south of Salt Lake City and contains about 100 square miles. During the days of silver mining in Utah Marysville was a lively spot, as a number of its mines, such as the Bully Boy, Webster and other properties, delivered monthly an exceedingly good tonnage of high-grade ore, but when the decline in silver set in Marysville became one of the stricken camps, as it lay far away, at that time, from railway communication. There were, however, a number of men in the district who believed it should also be productive of gold ores, and investigation soon proved that they were correct in their conjecture. Of the gold mines existing at Marysville there is none developed to so considerable extent as the Deertrail and Green Eyed Monster, which lie about four miles southwest of Marysville in Bullion Canyon, of very easy approach from the valley.

Adjoining the Deertrail on the west and owned by the same people, is the Lucky Boy. This is a mine of quicksilver, the ore being what is known as selenide of mercury and some years ago was extensively worked for the quicksilver, which ran as high as 60 per cent.

Northwesterly from Deertrail, about two miles, and at the head of Cottonwood Canyon there are a number of extensive groups of mines on many of which a large volume of work has been done, and from which a large quantity of ore has been shipped. They are the Webster, Dalton, Bully Boy, Clyde, Crystal and the old Chattanooga properties. The Standard, Star and Cascade mines are also in this vicinity.

## GOLD MOUNTAIN DISTRICT.

The Gold Mountain mining district, situated in the extreme north end of Piute County, has passed its tenth milestone and is now in a condition to make an enviable record. For years the growth and development of this soon to be famous camp was necessarily slow. Despite this the district has steadily pushed on. For the first few years of the camp's history the only property to attract attention was the Sevier mine, followed later by the Mammoth, Holland, General Connor, Senator Stewart, Annie Laurie, Blue Bird and the Deseret's Silver King. In addition to these are the following undeveloped properties: Surprise, Congress, Miller, Advocate, Trapper's Pride, Eagle, Ross, Senator Cannon, Fort Dodge, Bunker Hill, Rolling Hill, Gold Queen, Gold Pan and Rio Grande groups.

The Annie Laurie and Senator Stewart have been developed during the past season through a 680-foot tunnel driven in the Senator Stewart, the last 480 feet being on the vein, the exact size of which is unknown, as a twenty-seven-foot crosscut failed to reach the footwall.

The Golden Star Company bears the distinction of being the first dividend payer in the district, and its richest claim is the Blue Bird.

## DEEP CREEK.

Over southwest, one hundred and forty miles from Salt Lake City, lies a very wonderful mining country. It is commonly

known as Deep Creek, and contains about 10,000 square miles. Its mountains rise up from one of the most desert parts of the great western mineral reserve and contain in themselves a mining country, the wealth of which it will take ages to exhaust.

In 1872 Utah miners visited the rich discoveries at Deep Creek. It was then well known that there were great mines of gold, silver and copper.

Several hundred locations were made, on many of which much work was done and large bodies of ore exposed.

Lead ore is also found carrying light values in gold and silver, and for a time it was believed that the mines of that part of Utah could be worked at a profit. A smelting plant was erected at Clifton, then the chief center of Utah County.

After repeated efforts those who visited Deep Creek in the early seventies proved to their sorrow that the country was not one in which they could possibly make a dollar by mining at that time.

Let it be here understood that the country known as Deep Creek covers an area much of which lies in the State of Nevada, and it includes eleven independent mining districts.

Since the year 1892 investigation has shown that Deep Creek contains some of the largest gold veins of the intermountain country, as also very extensive mines of copper.

It is to the gold and copper of Deep Creek that the eyes of mining men and capitalists are being turned. There are more than fifty copper properties that show exceedingly well for the amount of work done upon them, whilst of the other properties partly developed there are over 100 good gold mines and prospects.

## LA SAL MOUNTAIN DISTRICT.

Few mining camps, isolated and surrounded with so many natural obstacles, have made greater advances in so short a period than the La Sal Mountains, and the past season it came steadily and rapidly forward to the producing point.

The year 1897 saw practically the commencement of the search for mineral wealth in the La Sals. That season closed with a good showing for the comparatively little development work that was done. While there was scarcely a hole sunk in solid formation deeper than ten feet, it was enough to indicate what might be expected by real development work.

Miners' Basin, Beaver Basin, Deep Creek Miners' Creek and Gold Basin all became well-known bases of operation.

Mineral Mountain, at the head of Miners' Basin in the backbone of the range, dividing it from Bear Basin on the east, was the place where the first mineral discoveries were made. Among the principal claims on the west slope of this mountain are the M. I. F., Double Standard, Skylark, Golden Scepter and Sunrise; on the east slope are the High Ore, Blue Bird, Bryan, Green Mountain, Little Dot, Free Coinage and Clear Crystal. On the west slope the Dillon tunnel is being projected, starting at the base of the mountain at the edge of the town of Basin City.

## BLUE MOUNTAINS.

The mining region known as the Blue Mountains District lies in Grand and San Juan counties. The formation of that beautiful country is granite, quartzite and slate, with a limited quantity of carboniferous limestone. The metallic wealth of the Blue Mountains is almost entirely in gold veins. As far back as the year 1892 the Danish Girl

Mine developed into a property of considerable importance as a gold mine, and since then about fifty other mines have been located and a limited amount of work done upon each of them.

The work recently pushed on the Gold Standard, Gold Dollar and Manila claims has in each exposed excellent ore bodies, and not only at the above-named properties of the Blue Mountain District, but also what is known as Big Indian, which lies between La Sal and the Blue Mountains.

## HENRY MOUNTAINS.

Since the year 1870 prospectors and mining men have looked upon the Henry Mountains as so many veritable treasure houses of the precious metals. This is a very high, isolated group of mountains near the banks of the Colorado River near the junction of the Green and Grand, rising to over 10,000 feet altitude. The Henry Mountains are as yet largely unprospected, but there are several gold properties located there, chief of which is the celebrated Bromide Mine.

Much of the ores of the Henry Mountains properties may be treated by the cyanide process, and the copper so far discovered there is an excellent ore for concentration.

## VERNAL.

The last district in Utah to spring into prominence is what is familiarly termed Vernal, or the Uintah country. It has not yet developed into sufficient prominence to identify itself as a mining district, yet a strong vein of copper has been uncovered which, according to recent reports, outcrops for a distance of forty miles.

## GEOLOGY OF THE COCHITI.\*

BY WM. JENKS.

The following is a resume of observations and conclusions arrived at since the last discovery of Cochiti Mineral District. Time and opportunity may change my idea, as neither myself nor any other person is infallible. We are all liable to err. If I have, it has been done unknowingly.

My knowledge of the country to the south of Albuquerque is not very extensive, so I will pass that by and try to describe what I have seen, and my conclusions as to the country due north from Albuquerque to the Chama River, a distance of nearly 100 miles, as it may interest some plain reader seeking knowledge, like myself, and draw out other opinions and observations.

The central core or axis of the Sandia Mountains is generally granite, a metamorphic or changed rock, of archæan or "beginning" age, foundation rock, probably the ruins of an older world, perhaps many worlds, worked over and over, and changed through the influence of heat, in the shape of hot water and steam, superheated or otherwise, and possibly charged chemically.

This foundation rock is solid as the earth itself, immovable, the rock of ages, and has long retained its place.

It seems to me that the eastern line of the mesa, east of the Rio Grande, between Albuquerque and Bernalillo, was undoubtedly the axis of an incline, i. e., the beds or layers commonly called the strata, dipped in opposite directions, to the east and west, from the two sides of the line of the summit of the underlying granite.

Imagine a gradual building up of sedimentary material, lime, sand, etc., surrounding



and to some extent covering the granite. As ages roll on, the continually increasing weight exerts vertical pressure and consolidation, necessitating considerable motion, and in a lesser degree horizontal contraction. The motion often torsional, results in friction, the friction results in heat, and as a product we have fluid lava forced upward and outward by the superincumbent weight in the line and plane of least resistance, a mountain high and dry on its solid foundation and a rough valley between, as a conduit for a great river.

There was much denudation or washing away of the broken up surface, redeposition of sandstones, gravels and shales, and later denudation of these; evidences of which we can sometimes feel in passing over arroyos and arroyitos.

An old authority says, "The mountains have been formed by the hollowing out of the valleys and the valleys have been hollowed out by the attrition of hard materials coming from the mountains.

"The great system upon the surface of of this earth is that of valleys, and however this system shall be interrupted and occasionally destroyed, it would necessarily be again formed in time, while the earth continued above the level of the sea."

The eastern slope of the Sandia Mountains fell in more pleasant places, movement was not so violent. To understand the geology, it should always be borne in mind that successive uplifts, downthrows and constant erosion have changed the face of the earth continually, by removing the upper surface of masses of rock, exposing those once buried and again burying others to in time again expose them.

Albuquerque volcanoes have a general northerly and southerly course. Their direction may have been influenced by some seismic (earthquake) disturbance, opening a fault fissure, that can be traced in a nearly direct line to the Cochiti District, and on, crossing the Chama River near Abiquiu, Rio Arriba County, with a course bearing to the east. Coming south, it is still possible that Hell Canyon, Tijeras Canyon, etc., may be in the axis of anticline, the western side of which may pass into this fault fissure.

This dislocation may be an extension to the north and south of an older fault fissure, originating in the Cochiti Range, to be hereafter described as the mother vein of that district; on the brink or the vein of an old river bed, that in the Cochiti widened out and formed a lake; or possibly the original walls, or country rock, were of some soft material, easily decomposed by the hot ascending waters, that were plentiful in early ages.

It must be admitted that south of the Cochiti Range this line of fault fissure is for some distance imaginary, capped as it is by sedimentary strata, and volcanic lava, but we find in some places considerable evidence on the surface of decomposed light-colored rock. This usually forms the walls of the fissure, and from its irregular joints, and its often showing when weathered rings in series, it may have been diorite.

We will now pass on to the Cochiti District. The country is now partially and has been wholly covered with trass or pumiceous tuff, sand and conglomerate. Tuff is an accumulation of ash and other substances, ejected from volcanoes, and more or less firmly compacted together. In this case, it is a light and spongy rock having numerous vesicles or small cavities, that originally inclosed steam or gases. Obsidian or volcanic glass is of the same composition, but solidi-

fied quickly. Pitchstone, rhyolite, etc., have the same acid character and are archæan rocks as granite, excepting that they have been remelted.

The tuff or tufa was erupted as mud in various stages of humidity accompanied with intense heat.

Acid rocks are usually light in color, and composed principally of silica or sand similar to quartz.

We will consider this as the first eruption of the district in both chronological and geological order and extensive character, that is, it covered the surface of the earth in that locality.

The ordinary mind has no conception of the vast amount of this kind of material now covering the older rocks of the greater portion of the Cochiti and Jemez Range of mountains.

From some cause or other we have had an extrusive eruption, that covered the surface and redistributed the equilibrium. There was also undoubtedly considerable rocking motion, alternately from that and other forces, leading to another eruption intrusive in character, that is, one that from external pressure, insufficient strength, viscosity, or some reason or other, was prevented from coming to the surface, but at the same time broke up the superficial volcanic tufa, and left it in a very fit state to be easily washed away, thus exposing the mineral veins, that are a common and usual accompaniment of the basic intrusive rocks, the diorites and the porphyries.

They do not flow over the surface, are a never failing sign of great denudation, have come from unknown depths, have no particular period of eruption, and their source may be far away.

Basic rocks are poor in silica and sand, seldom glassy, and generally of a dark color. Acid rocks are more general, basic rocks more local in their distribution. Basic rocks carry a good percentage of the bases, iron, manganese, lime, etc., and are a chemical compound more easily fusible than the lighter colored acid or silicious rocks. In the absence of basic rocks it is very questionable whether we should ever have had any Cochiti or any other mining district.

(To be Continued.)

#### NOTES ON YMIR MINE AND ITS MILL PRACTICES\*

BY S. S. FOWLER, S. D., NELSON.

Lying north of the International Boundary, west of Kootenay Lake, east of Columbia River and south of Nelson, and the outlet of Kootenay Lake is a roughly quadrangular mountainous country, covering about 1,450 square miles.

Occupying the central portion of this quadrangle is the drainage area of the Salmon River, a considerable stream, which has its source within a few miles of Nelson, and flowing south joins the Pend D'Oreille near the Boundary.

This Salmon River country, covering about 900 square miles was practically inaccessible until the construction of the Nelson & Fort Sheppard Railway in 1893, and it was not until the summer of 1896 that any considerable mining activity was manifest. The country, therefore is possessed of a very brief history. Aside from the placer mining operations of 35 years ago, which were carried on

near the mouth of Salmon and along the Pend D'Oreille, there is now no evidence of mineral location until about 1885, when, two years before the discovery of Silver King near Nelson, by the Hall brothers, locations of quartz claims were made by these same men near the head of Wild Horse Creek a small stream entering the Salmon from the northeast at the present town of Ymir, 18 miles from Nelson.

Nothing more appears to have been done for the next decade along the Salmon Valley, but, as stated above, in 1896 many claims were staked, and since then the district has made substantial progress. Today, aside from the property named in the title, the Fern on Hall Creek, the Porto Rico, on Barret Creek, the Yellowstone, on Sheep Creek, the Second Relief and Arlington, on the North Fork of the Salmon, are considerable producers, or nearly in condition to produce, and there are many other properties throughout the district affording excellent prospects, and indeed some of them have made small shipments of smelting ore.

Physically, the Salmon country is not complicated in structure. It is mountainous, but few of the mountains reach an altitude of more than 7,500 to 8,000 feet, and the summits are generally rounded. The creek valleys are deep, however, and glaciation appears to have been an important factor in determining the present topography. The glaciers, however, have I believe all disappeared, although in the Slocan country to the north there are many remnants of that powerful moulding agent to be seen.

The rocks which underlie the region being described are predominantly of igneous origin. In a very general way it may be said that east of Salmon the granites are in evidence, while to the west augite porphyrites, schists derived from them, some small gabbro bosses and large areas of tuffs and agglomerate occupy the field. But throughout these rocks may be seen considerable inclusions of sedimentary rocks, principally slates, except along and near the range which forms the watershed between the Salmon and Kootenay Lake, where there are thick beds of quartzites and some crystalline limestone, extending more or less continuously southwesterly into American territory. The country is a very interesting field for geological research, and deserves more extended study than can be given it for a long time. The Dominion Geological Survey sent a party into this field under R. G. McConnell, during the summer of 1897, but little more than a general reconnaissance was accomplished, the shortness of the season and smoke from forest fires usually causing an early return of the field parties.

As to the respective ages of the rocks hereabouts, the slates have not been traced to connection with the Kaslo series east of the Slocan slates, but from their lithological features, one is inclined to ally them with that series, and if that is proper, then the small slate areas of Salmon River are probably of Cambrian or pre-Cambrian age. The various basic igneous rocks may be of different ages, but Mr. McConnell places the augite porphyrites in the carboniferous. Some of the granites appear to be comparatively recent, but the youngest rocks in the vicinity occur in dikes of blackish to dark grey color, varying much in texture and composition, and piercing the rocks above named, and I believe, most of the veins of the district. Generally, these dikes may be described as mica diabase, the biotite probably being a

\* (Paper read before the September meeting of the Canadian Mining Institute.)



first product of alteration, while frequently the whole mass has become completely kaolinized.

Coming to the Ymir Mine itself, we find it on the west side of the valley of a north fork of Wild Horse Creek. This valley lies in a slate area several miles in length, and about 4,000 or 5,000 feet wide. The slates are limited on the east by granite and on the west by porphyrite. They strike about N. 35 E. and stand on edge, the line of contact with the porphyrites being approximately parallel to the strike. Extending from a point near the contact, in a direction about N. 65 E. is a fracture in the slates which is traceable several thousand feet, but within the distance along which this one fracture can be identified there are no more ore bodies known other than that which has become the Ymir Mine.

This property was taken over by its present owners in November of 1896, since which time 5,000 feet of development has been done, resulting in showing an ore body about 500 feet in length, with its end limits practically parallel and vertical. A depth of nearly 500 feet has been attained, but very little water has been encountered, in fact barely sufficient to justify running a pump for sinking.

In plan this ore body shows a decidedly lenticular shape, with a maximum width of ore of about 30 feet. No disturbance of importance have shown themselves, but there are many slips and several partially open narrow fissures, while two principal dikes with a number of branches cross the deposit, generally nearly at right angles to the latter. From a structural standpoint these dikes form one of the most interesting features of the mine, and will be alluded to again. Beside the numerous horses of slate, which in so wide a fissure must be frequent, the vein filling is quartz, impregnated with pyrite, galena and blende, no copper mineral having ever been found.

The ore appears to have been deposited at two different periods or else derived from different sources, for the eastern 300 feet shows a perfectly white quartz, and the sulphides contained are coarser in structure and brighter in color than in the western 200 feet of the ore chute, where the quartz is not only frequently of dark smokey blue color and often nearly opaque, but the gold tenure is considerably higher. Near the region where these two varieties of quartz join they are curiously intermixed, but may be easily distinguished. Throughout the mine the walls are generally very free, but in places along the hanging of the blue quartz there is not only no clay parting, but the quartz seems to have replaced the slate, retaining the structural features of the latter, and becoming difficult to distinguish underground from the country rock.

(To be Continued.)

## PIERCE COUNTY MINES.

(Continued from our issue of Jan. 1st, 1900.)

### LEOLA MINING COMPANY.

"We next visited the Leola Mining Company's properties, owned by Chester Thorne, Charles Richardson, T. H. Wilkins and others, all Tacoma people, stopping first at their camp, which is located about 600 feet down the mountain toward Canada Creek from the Surprise Mine, and consists of an office, cook house, bunk house and superintendent's house, which is occupied by Superintendent Ferguson and wife. The buildings are neat and comfortable. The Clipper Mine is located about fifty feet lower down the mountain and

adjoining the entry is located the blacksmith shop. This entry was started on less than six inches of ore and is now in 230 feet; the vein is five feet wide, having six inches of solid chalcoppyrite ore, the samples we took assaying:

"Gold, .02 of an ounce; silver, 6.40 ounces; copper, 15.50 percent.

"Total value, \$16.59 per ton.

"We next visited the Climax Mine, which is opened about 1,200 feet south of the Clipper, on the same mountain side and belonging to the same parties. Here is a rock slide some thirty feet wide which has been blasted away and entry driven about forty feet on the vein, but as no solid ore had been struck we did not take any samples.

### WORKING OTHER CLAIMS.

"Mr. Wilkins, the Superintendent, has also started a shaft on the Alcoa claim which is reported very promising, but we did not visit them. Mr. Wilkins is running a crew of fourteen men, double shifting the Clipper and Climax and running a shift on the Alcoa.

"The Blue Star group of mines is located about seven miles from Fairfax on the Washington Co-operative Mining Syndicate's trail and has several fine looking veins, a sample from which assayed:

"Gold, .04 of an ounce; silver, 6 ounces; copper, 9.50 percent.

"Total value, \$39.55 per ton. They belong to A. W. Grayson and Irish Brothers, who have run some forty feet of tunnel and are continuing development work.

"The Margaret, belonging to Angus Ferguson, is located 1,500 feet southeast of the Surprise, and has good surface showings, a sample from which assays:

"Gold, .14 oz.; silver, 7.40 oz.; copper, 10.20 percent.

"Total value, \$48.98 per ton.

"The Cleo Mine, located on the south side of the Carbon River, opposite the mouth of Canada Creek, belonging to E. E. Brehm, of Wilkeson, and William Evans, has the reputation among the miners of having good veins. Buildings are now being erected, and after January 1, 1900, development work is to be pushed.

"The Summit Mine, lying about 4,500 feet east of the Surprise, has recently shown some good ore. This is the property W. H. Remington of this city is interested in.

### DEPOSIT OF PULP.

"The Hepzibah, owned by the Sexton Brothers and others of Tacoma, and located on the south side of the Carbon River, opposite the Blue Star group, is showing up well. They are now driving a crosscut tunnel 150 feet long through granite to crosscut their vein, which they expect to have completed by early spring, having already between fifty and seventy-five feet driven.

"We are reliably informed that about one-half mile from the Carbon glacier, on the south side of Carbon River, Mr. Watson and others, of Orting, are opening up some fine veins, having just completed thirty feet of entry, and having let a contract for an additional thirty feet, and that on the east side of the Carbon glacier and across the Winthrop glacier, called the 'glacier basin,' there are over fifty veins located, and their most accessible route is via the Carbon River Valley. This is where Professor Chamberlain is located. He reports sufficient funds now in bank at Hoquiam to put the properties on a shipping basis, which he intends to do the coming spring.

"The Buckley Mining Company have lo-

cated two groups of claims on Chenuis Creek. There are many other properties located, a partial list of which we submit in Exhibit 'I.'

### DISTRICT HEAVILY TIMBERED.

"This district is heavily timbered, which makes it very hard to prospect, but which will be of incalculable value for building and mining purposes. The varieties are fir, spruce, hemlock, red cedar and Alaska cedar.

"Immense water power everywhere abounds, which will furnish power to crush, concentrate and matte the ores.

"Coke will be manufactured at Fairfax, which means cheap reduction of ores. We do not know of a locality in the United States where rich ores, water power, timber and coke are so closely associated with the opportunity for cheap transportation, for the haul from the mines will be entirely down hill to the railroad at Fairfax.

"We regard a wagon road as an absolute necessity to the speedy development of this district, and that construction is feasible at a nominal cost for a mountain road.

"In regard to the commercial advantage the speedy development of this district would be to Tacoma, we believe it would benefit every man, woman and child and that if fostered by Tacoma interests and the trade kept here, it will do for Tacoma what the mines of Montana have done for Butte, Helena and Great Falls. It must be borne in mind that this territory is naturally tributary to Tacoma, but if we do not exert ourselves to care for it, we may find our friends across the bay will be enjoying the traffic.

### RECOMMENDATIONS.

"First—That the Chamber of Commerce and Board of Trade pass a resolution commending to its members and the public generally the development of the mines in the Carbon River Mining District and requesting our daily papers and all papers and periodicals published here, to give our mines special investigation and mention, to the end that our city may receive the immediate benefit now being enjoyed by our sister cities.

"Second—That the mining committee of this body be instructed to visit the Pierce County Commissioners and urge the building of a wagon road from Fairfax to the Surprise, Clipper and other mines, to enable the taking in of machinery and hauling out of ore, which is now being piled up awaiting transportation to Tacoma, and to continue their effort until the road is obtained.

"We submit herewith reports of the geology in the district by C. C. Snow, E. Edward Cone and T. A. Wilkins, all practical miners of many years' experience.

### LOCATIONS IN THE DISTRICT.

"Locations in Carbon River Mining District are:

"Surprise, Ship Lake, Ship Lake Extension, Alpena, Rainier, Snowdon, Sunnyside, Huron, Okamos, Hog Back, Ferry Hill, Leadville, East Lake, Jim Dandy, Tacoma, Eureka, White Owl, Black Hawk, Gray Eagle, Gray Eagle Extension, North Mine, Plexus, O. K. Crack-a-Jack Extension, Pyrite, Apex, Oxide, Quartz Crystal, Quartz Crystal Extension, Bassick, Colorado, Mountain Ferguson, Cascade, Nora, Jennie, Alcoa, Dolphin, Dewey No. 2, Rosette, Conglomerate, Michigan, Golden Star, Golden Star Extension, Crack-a-Jack, 1st Chance, London, Eureka No. 2, Margaret, Ellis, Ellis Extension, Nevada, Emma, Montana, Chicago, Summit, Black Giant, Phoenix, Zion, Bellingham,



Gold Hill, Cedar, Monarch, Diamond, Pine, Irene No. 1, Irene No. 2, Heitman, Maj. Copley, Forest King, Little Fortune, Washington, Myrddyn, Hard Scramble, Palmer, Big Buck, Hepzibah, Alpha, Intrusive Sheet, Morning Star, Falls Creek, Lincoln, Gulley, Glacier, Col. Thompson, Old England, George Archibald, Peacock Blue, Clipper, Climax, Hemlock, Sulphide, Champion, Eagle, Ruby, Rockford, Carbon No. 1, Carbon No. 2, Silicate, Capt. Gulley, Blue Star, Dawning Hope, Silver King, Carbon, White Bear, Honey Pot, Silver Head, Cariboo, Mesmer, Sadie, Cleo, Bonanza King, Age of Reason, Lada Clara, Austin, Beautiful Bill, Spes Bona, Royal Canadian, Blue Star.

(To be Continued.)

## CORRESPONDENCE

### ARIZONA.

(From Our Special Correspondent.)

CHLORIDE, Ariz., Jan. 12, 1900.

Considerable surprise was expressed this week at the news that the Elkhart Mine had closed down and all hands discharged. The rumor seemed to have the face of truth until the mine was visited and the truth of the matter ascertained. For some time past the Elkhart has been having considerable new development work done which required the work of about twenty men more than were usually employed. The management, however, on the first of the year, decided to discontinue this branch of the work for the present, at least, and in consequence all those employed on development work were discharged. The mine is producing as much good ore as ever, and everything is moving along in its old channel of prosperity, and with the coming in of the new year, promises greater things than ever.

The new concentrating plant at the Merri-mac Mine is almost in readiness to fire up. The engine, boiler and all the machinery is the finest and best ever brought into Arizona, and the plant is destined to work well and to more than double the old methods of work. There is an abundance of ore on the dump awaiting its completion and the ore bodies in the main shaft are fully as great as ever. Members of the company will soon arrive from the East, and a system of new development for ore will be inaugurated.

The Payroll Mine is getting its new gasoline engine and machinery in position quite fast, and the big hoister will soon be in readiness to facilitate development work. At last reports it was said that the mine was to have a new 100-ton concentrator, but Mr. Timmons has not been seen; the rumor is not verified.

The Midnight Mine is tied up and standing stock still. The trouble is non-payment for contract work by Mr. Jones, who is at his home in Chicago. The owners, who are also the contractors for the late development work, keep the mine guarded until the present conditions are changed. The mine has a good body of high-grade gold and silver ore opened up below.

### Arizona Activity.

(From Our Special Correspondent.)

PHOENIX, Jan. 7th, 1900.

Hon. G. W. Hull and John Argyle of Yavapai County have recently located and acquired control of eleven locations to the west of the Congress Gold Company mines in central Yavapai County, claimed to be on the Congress ledge. Mr. Hull has been on a

still hunt after this property for nearly four years. The Congress Company has covered the vicinity to the east, but through some evident oversight a valuable section of ground to the west was left unlocated. Mr. Hull will begin operations at once in development, and will soon erect the necessary mill and works for the treatment of ores.

It has been rumored that the mine and smelter of the Copper Queen at Bisbee soon will shut down for several months, for the purpose of overhauling the present plant and installing modern and up-to-date machinery and appliances, as well as to increase the capacity of the works.

The Amalgamated Copper Company—otherwise the Standard Oil trust—has entered Arizona copper fields in an energetic manner. Its confidential agent, W. E. Burrage, a noted expert, upon whose recommendation the famous Santa Rita mine in New Mexico was purchased for \$3,500,000, is now superintending operations on a large group of copper claims within eight miles of the King Solomon mines in Northern Maricopa County. He states that the copper indications are the best that he has ever seen in any district. There is a gossan capping that can be traced for eight or ten miles, and in some places is a half-mile in width. In the Spring a large amount of machinery will be necessary for the prosecution of active work on this property.

J. A. Mathies, also a mining expert in the employ of the Amalgamated people, has been in the vicinity of Jerome and Prescott for the past six weeks, and has taken leases and bonds to the aggregate sum of \$400,000 on claims and prospects in that region. The Standard Oil seems at last to have decided to come into Arizona. Just after the purchase of the Anaconda properties from the Daly corporations by the Standard Oil Syndicate it was reported that the latter pool would purchase or control every large copper mine and smelter in the United States. An offer was made to W. A. Clark for the United Verde at Jerome. Mr. Clark refused to entertain the proposition, replying that the United Verde was not in the market. For a time thereafter the Amalgamated Company seemed loath to enter Northern Arizona, not wishing to antagonize Clark; but it would now seem that conditions have changed, for it is eager to acquire copper properties.

The recent changes in the management of the Copper Queen at Bisbee, the Arizona at Clifton and Morenci, and the Old Dominion at Globe, are said to have been inspired by the Standard Oil people, who have acquired, so it is reported, large blocks of stock in each of the companies, these changes being in line with a policy of aggressiveness and increase in the capacity of the various plants coming under control. The changes will involve the expenditure of vast sums of money in modern mining and smelting machinery and appliances, particularly in the adoption of electricity wherever practicable, such as trolley lines in the mine and on the surface, electric cranes, tramways, silica mills, and electric motive power for shop machinery.

Jerome is the center of great bustling in copper mines. New companies spring up each week, and the entire country for miles around in all directions is plastered with location notices. G. W. Hull already has organized three companies for the development of various claims near Jerome, and has two others in process of formation. The News, being operated by Owens and Van Zandt, of Butte, Montana, is now down about 900 feet.

It has a force of 35 men, and is working 24 hours a day.

The United Verde Extension, near the News, is pounding away looking for the mammoth ledge of the United Verde, while the Black Hills people on the crest of the same hill, claim to have encountered this great ore body in the upper shaft at a depth of 70 feet.

The Copper Chief and Iron King properties on Equator, the former under management of Arthur Hendy and the latter of J. L. Giroux, are being worked as energetically as men and money can do it. This Equator Hill is fabulously rich, and has been tied up in the courts for the past ten years by litigation between rival claimants to the property. The present division is the result of a compromise effected a year ago between W. A. Clark and Hendy, et al., and the property will be opened up in the spring in earnest.

The Cherry Creek District in Yavapai County continues a producer of gold. Each month or six weeks witnesses the shipment of bullion to the value of from \$10,000 to \$20,000. Another fifty-stamp mill will be erected, which will increase the output. Machinery is badly needed in this district, but is very expensive on account of the rough character of the country which necessitates the use of pack trains.

L. D.

## CALIFORNIA.

(From Our Special Correspondent.)

MANVEL, Jan. 8, 1900.

Sam Yount's copper mine at Good Springs has shipped another car of rich copper ore to the smelters from Manvel station.

Johnny Yount, Ben Hamilton and Jim Fisk have bonded their copper mine at Good Springs, Nevada, to a gentleman by the name of Clark. The ore now being shipped from Nevada to the smelters looks very rich and of good combination.

Mr. Moore has another carload of copper ore from his Excelsior copper mine at Copper Camp on the platform at Manvel ready for shipment as soon as it can be had.

The daily product of metallic copper bullion by the Valley Wells (Ivanpah Smelting Co.) smelter is about 40 bars of 300 lbs. each, or six tons bullion per day, and the gold values in it are not far from \$5 per each ton of copper—and upwards of this.

On the platform at Manvel are about 57,000 pounds of copper bullion from the Copper World Smelter, and as soon as cars can be had this bullion also will go to market, and there is more coming.

An amount of lead-silver-gold bullion from the Tacopah Smelting Works awaits shipment from Manvel Station. It is stated that F. C. House of this company or the company will put in a larger jacket furnace soon and increase the product. To that result a force of men will be put on to the mines there.

Jim Patton of Vanderbilt has sold Extension East of Gold Bronze Mine, three claims, as publicly stated for \$12,000, and Mr. Fay, the purchaser, started up work on the same immediately, opening up the ledge of vitreous quartz five to six feet wide, at 60 feet depth, averaging over \$50 per ton, showing free gold also. There are streaks of ore showing oxides of tellurium, making this ore very pretty.

Pete Wagoner of Vanderbilt, owner of the Alice Mine, a recent location near the Boomerang Mine, struck a bonanza of ore on Friday last, similar ore to the body found in the



Extension of the Gold Bronze. The inhabitants of Vanderbilt were out viewing Pete's discovery on Sunday.

Mr. Wood of New York is working full crews of men on the Turquoise claims, and an exploration shaft is being sunk down rapidly.

Manvel's mail to the County Recorder of San Bernardino County delivers more new location certificates for record than any other point in the County.

The Barefoot Mine at Sandy, Nevada, 46 miles north of Manvel, has started up the steam arastra, running on the low-grade ores. The rich ore is being sacked for shipment to the smelter. This ore is gold, some free milling and porphyritic, some very rich ore. This one claim is now under bond for \$100,000, and there is also a bond on the Green Monster claim. The parties having it are exploring the property.

A correspondent writing me lately says: "Capt.:—Where in H—— is Manvel, anyway?" To him and all others so at sea let me say Manvel is at the terminus of the California Eastern Railway, near the base of New York Peak, and about 30 miles nearly due northwest of Blake Junction, a station on the Santa Fe route. The gold field is but two miles from Manvel, up the eastern slope of New York Mountain. The elevation of Manvel is 4700 feet, and there is ample water and wood, as well as a good climate for a mining camp.

The strike on the Good Hope claim of last week developed well, and thirty tons of ore are on the dump now in consequence. There are five claims in the Good Hope group. This group is located on New York Peak, just south of the mouth of Keystone Cañon, and is also about two miles northerly from the old New York Mines, also about one mile west of the Old Shoes Mine group of claims that were recently sold. The Good Hope ore is similar to the Old Shoes claim ore.

The Aurora claim of Wolframite or Tungsten ore near the Columbia Mine, Providence Mountains, contains Tungsten in paying quantities. It belongs to Mr. Deitz. The samples shown are crystalline and black.

Manvel has several new houses in the past few days, and now Monaghan, Briggs and Murphy of the Needles are to move from Vanderbilt a 40x60 foot building and also a residence house to Manvel. When in place it will be fitted up for sleeping rooms in connection with Mr. Nichols' hotel. This is a substantial improvement here.

Mrs. Payne has received her appointment as postmistress of Rosalie (Valley Wells) and the mail route will be opened by the United States instead of by private carrier.

It is understood that there will be a daily mail soon between Blake and Manvel, and if there is not a daily train system established, then there will be a daily train of Concord coaches put on this as a stage route. Inasmuch as Manvel is a distributing center of several United States mail routes, it is understood to have been decided that a daily mail service must be given the Manvel office from Blake. This is good news.

More and more of the gold field ground of New York Peak is being daily located. A large lot of samples of the new discovery are soon to leave here for assay at Los Angeles, Calif. Hagan, Lewis & Co. of San Francisco have their examiner and purchaser in this camp now looking out for new discoveries.

A recent discovery on New York Mountain was sampled in 25 lb. lots of selection. This

mill run gave \$22.60 per ton gold. The sample was taken at about 15 feet depth, a quartz with fine pyrites as the ore.

Gus Hamstadt and partner's crew of miners on New York Peak keep up a merry booming of blasts on the very rich copper and silver-lead recently opened up.

Soon it will be possible to obtain by purchase outright a village lot at Manvel, and the miners are jubilant.

An extensive exploration shaft on the Old Shoes Mine will soon be in operation, going down with the vein. A contract was let January 8th for a 100-foot shaft on this mine to Mr. Duval. GILES OTIS PEARCE, M. E.

## Miscellaneous Mining News.

### ALASKA

The Klondike output for the year is: Gold, \$16,110,129; silver, 1114,617. In the year 1898, the gold yield was \$11,038,478, and silver, \$80,728; an increase of Klondike gold is shown of \$5,071,651, and of silver, \$34,119, the total increase being \$5,517,770. The Klondike annual gold yield thus for the first time eclipses that of California by about \$1,000,000.

### ARIZONA.

On the Rough Rider the principal one of the ten claims, owned by Judge J. D. Bethune in Walnut Grove district, near Prescott, they are sinking at the junction of two veins, where the sulphurets are beginning to show in quantity, and he thinks he has the best undeveloped copper mine in the country. They have a small force of men at work at the mine, and expect shortly to erect a smelter upon the property.

John F. Williams is organizing a company to develop two copper claims he has located in the Dragoon mining district, assays from which run 40 per cent copper.

During the last four months of 1899 the mining department of the University of Arizona at Tucson, in addition to the regular work of the institution made 71 qualitative of rare or peculiar minerals gratuitously for the mines and prospectors of the territory; 11 quantitative analyses; 351 fire assays; 6 cyanide tests on gold ores and 1 mill run.

### CALIFORNIA.

#### AMADOR COUNTY.

##### The Kennedy Mine.

The new station in the north shaft of the Kennedy mine, known as the 2300 foot, is being opened, the sinking having recently been completed to that point. As all levels in the Kennedy mine are named from the vertical depth below the level of the collar of the shaft and as the shaft is an incline, this makes the actual depth of the shaft between 2700 and 2800 feet. The new shaft at the Kennedy, which shaft is vertical is now 900 feet in depth. Ground was broken for this shaft on Thanksgiving day, 1898, and about fifty feet sunk by windlass, when the water became so troublesome that little progress was made until the new power plant was installed in April, 1899, since which time about 850 feet have been sunk. Four power drills are used in the sinking, and, although the rock is very hard, steady work has made a good showing

in the shaft. The equipment of this shaft is a steam furnace and boiler, the steam from which operates the hoist, the compressor and the other necessary and useful machinery around a well equipped mine. As a whole, the year's work at the Kennedy mine, has been very satisfactory.

#### BUTTE COUNTY.

Last week two of the big gold dredges on the Feather River, a little below Oroville, resumed operations with electric power after a shut-down of about a month to change machinery and also because of lack of fuel. Power is supplied by the Yuba Power Company from the Yuba River, at a distance of twenty-six miles. One or two more will soon use electric power as will two new Postlethwaite or Risdon dredges to be launched this month.

The two new dredges are very large, having a capacity of handling 4000 cubic yards of gravel per twenty-four hours. The largest yet installed in this State have a limit of 2500 yards. The new ones are of the continuous bucket type, 30 by 80 feet in size and designed to reach thirty feet below water to stack tailings thirty-five feet high. There will then be in the Feather River, near Oroville, five dredges of the Postlethwaite type, two of the scoop type and a continuous bucket dredge of Eastern design.

#### CALAVERAS COUNTY.

Active operations are being carried on at the Meade gravel mine in the Rich Gulch district. The mine is being worked by the tunnel process and the lead is about ten feet in width. The rock is being crushed in a Bryan roller mill. Steam power is used.

The sinking of the main shaft of the Demarest mine from the 400 foot to the 600 foot level, began on Thursday, and will henceforward be vigorously prosecuted to completion.

Operations have been commenced at the Kramer gravel mine, in Poorman's Gulch. The mine was recently purchased by an English syndicate. The old tunnel is to be cleaned out and retimbered and steel rails will be put down. The present tunnel is in 1800 feet. Lumber has been ordered for the necessary outbuildings and also for a boarding house. As soon as the mine is in proper condition a ten-stamp mill will be erected.

#### EL DORADO COUNTY.

The Bowler mine has closed down temporarily.

The ten-stamp mill at the Cambrian mine is again running, a full force of men is employed and a large body of ore is being exploited.

It is said that the Indian Diggings Gold Mining Company now has about twelve men in its employ, and that work is progressing steadily at the mine, although the snow interferes somewhat.

Development work at the Pioneer copper mine, near Pilot Hill, is being vigorously prosecuted. Twelve men are now steadily employed and the force will be increased soon. In addition to the copper, which averages over 8 per cent the ore carries good gold and silver values.

#### KERN COUNTY.

Joseph Schneider of Riverside, who has been out at Randsburg for several weeks past, says Randsburg is booming, and while the rush there and talk over the mines of the camp is



not as great as was the case a couple of years ago, the camp is, nevertheless, a good one, where lots of bullion is being taken out each month.

In the Copper Basin sixteen miles north of Randsburg, the Phoenix Company of Los Angeles, is developing good copper prospects. The company has a force of men at work. On the west side of Wolfskill mountain, a short distance from Copper Basin, the Copper Cliff Company is opening up a number of promising claims.

Judge Davenson of Randsburg has resigned the office of Justice of the Peace and O. J. Doty has been appointed to fill the vacancy. The Judge goes to Jerome, Arizona.

Major Taylor of Red Rock has sold his general merchandise business to J. E. McGinn of Garlock, who is moving the same to the latter town.

The old Visalia mill has been moved from Garlock to Randsburg.

Messrs. Doty and Thomas have finished cyaniding for the present season on Kelsey Creek, and will cyanide 12,000 tons near Tebachapi while their other works are frozen up.

Burcham and Singleton of the Raud Mine have located four sections of oil land on the Northeast slope of Black Mountain, north of the coal mine.

The Yellow Aster Co. of Randsburg are reported to have commenced operations on the old 40-foot well at Goler, with the view of pumping water to the former place.

Both the Southern Pacific and the Santa Fe railroads have surveyors in and around the Garlock part of the desert surveying towards Panamint.

Fresno parties have bonded the coal and copper mines of F. H. Heald for \$56,000.

Mojave is building up rapidly in the burnt district and this time with substantial brick buildings.

The oil boom at Bakersfield and vicinity is taking on colossal proportions and promises to be one of the best oil fields in the State.

The country North and East of Johannesburg is developing very rapidly and the road from that railroad terminus in the aforesaid direction is literally lined with freight teams and prospecting outfits of every description, for Argus Range, Inyo County, Panamint, Ballarat, Borax Lake, and all the camps in that direction.

#### RIVERSIDE COUNTY.

W. A. Hayt, of Riverside, is developing his Gold Eagle claim, in the mountains west of West Riverside. The property is looking well at present.

Work on the Stanford Mine, in the Pinecate District, near Perris, is being carried on vigorously at present by L. A. Hearne, the owner.

#### SAN BERNARDINO COUNTY.

As the result of a run of thirty tons of ore a gold brick worth \$800, is reported from ore taken from the O. K. mine at Virginia Dale, and was milled in the ten-ton mill of the O. K. Mining Company. This is not the first bar produced by that company by any means, for the O. K. is one of the mines that is worked for what there is in it and not an assessment or development work, and it is paying the

owners big money. Work is now being done on the 250 foot level, and is showing up in a very satisfactory way.

Last week Joe Lycere and partners, working upon a new discovery called the Good Hope, a claim in the group of the same name at Manvel, including the Robust, Horseshoe, Columbia and Olympia, made a wonderful discovery, the vein being about 30 inches wide and to all appearances a perfect duplicate of the mineral in the Old Shoes Mine, the ore being a quartz studded with sulpho-tellurides.

The Good Hope group of claims has been located less than a month, and at a point about three miles Southwest of Manvel on the West side of New York Peak on the upraise of the mountain. It is expected \$36,000 in development work will be expended in the near future on this property.

The new strike in the old New York Mine Southwest of Manvel is reported to carry 2100 ounces silver. A carload of this ore was shipped by Wm. Sisty to the reduction works at Barstow last week. The ore is shipped from the old station of Purdy, two miles from Manvel.

The Dead Indian Mine, a new discovery owned by Messrs. Stewart, Cook, and others, located on the North side of Shadow Mountain, Northwest of Manvel.

Copper Camp, near Manvel, is the scene of considerable activity. Mr. Moore is shipping ore from his mines containing copper and gold to Pueblo, Colorado, for reduction which nets about \$1000 per car.

#### SAN DIEGO COUNTY.

The Boulder Creek Company will incorporate under the laws of Arizona for one million dollars. Their mining location is ten miles from Julian.

The San Diego Chamber of Commerce has added a Mining Department to their rooms. The entrance is on Sixth street, separate from the other exhibit, and now contains a large collection of mineral specimens.

The Dewey Mining and Milling Company, who own a group of mines in the Grape-vine Mining District, have a 150-foot shaft on their property in on a ledge 3 to 4 feet wide, of high grade ore. The following are the officers and directors of this company: George Puterbaugh, Pres., J. A. Heath, Vice-Pres., L. F. Doolittle, Sec'y, W. R. Farnsworth, J. S. Akerman, George M. Hawley, Frank P. Frary.

Quite a stir was made in mining circles by the purchase of five prominent mines, in the Julian District, by D. C. Collier. The mines are the Cincinnati Belle, Gold King, Gold Queen, Gold Rock and Gold Brick. The mines were always considered good property, and mining men state that with proper development they will pay a good dividend. Mr. Collier purchased the property from Fidel Ganahl. The price paid was \$10,000.

Several months ago work was begun on a tunnel to drain the Old Kentucky Mine in the same district, and when it had penetrated the hillside about 300 feet, the results were more than counted upon. It is evident that the tunnel tapped the underground flow that had filled all the mines in that district, and now a constant stream of at least 15 miners' inches of water is flowing out of the tunnel. The water that heretofore stopped operations in the Old Kentucky, Kentucky S, and Cincinnati Belle has disappeared, leaving this group of mines entirely dry.

#### SHASTA COUNTY.

The Mammoth Copper Mine, in Shasta County, which has been peddled about for a year or so, under a bond held by J. F. Coleman, has reverted to its owners, who will now try to dispose of it.

Under an arrangement made some time ago, Mr. Coleman agreed to pay \$10,000 on Jan. 1, \$40,000 on Feb. 1, and \$50,000 on April 1.

A week ago, Mr. Coleman asked to be allowed to pay \$3,000 on Jan. 5, 47,000 on Feb. 5, and the remainder on April 1.

This proposition the owners refused to entertain, and the Coleman deal is definitely off.

Mr. Coleman has spent \$25,000, he says, on the proposition and is ready to spend \$15,000 more, for he believes in it; but he says that at present he could do nothing under existing conditions in the East unless he could get more time.

#### TUOLUMNE COUNTY.

Arrangements are being made for sinking the shaft on the Brown Mine to a depth of 1200 feet.

The Santissimo Mine, at Jackass Hill, yielded a \$2500 pocket last week. The mine is being worked by Charles Gillis and Thos. Bluett.

Active work is to be commenced at the Sonora and Duffield Mines, near Arastraville. A Michigan company will furnish the capital.

The Mustang Mine, on Mustang Gulch, about two miles south of Confidence, has been bonded to San Francisco parties, who will commence work upon it at once.

At the Golden Gate Mine, 80 miners are on the pay roll. Drifting and stoping in many parts of the mine constitute the present underground operations. The mill is running full blast, and the famous old property is said to be easily sustaining its good record as a bullion producer.

#### COLORADO.

During the past twelve months the great Cripple Creek District has produced an even round of \$20,000,000 worth of gold. The camp paid back to investors during that time four and a quarter million dollars in dividends, while undivided profits amounting to that much again remain in the treasury as convenient nest eggs for the next year's accumulation.

During the year the production has increased 100 percent, by the showing made this last month, for it will be recalled that last January the camp produced \$1,500,000 worth of ore; December produced, it is estimated, a round three million dollars. The camp paid out in dividends in December alone over \$1,000,000, which is equal to the amount of dividends paid out the first six months of the year. Another thing is the substantial gain which the year has made in dividend paying over last year. During 1898 the mining companies operating in the Cripple Creek District paid out \$2,590,000 in dividends. During 1899 the dividends reached \$4,250,000 and perhaps close to \$4,500,000, a gain of over 100 percent.

Now departing from the financial side of the case a glance may be taken at the industrial improvements which the year has witnessed. One has but to note the great improvement which has been made at the various mines. The Gold Coin is just completing a \$200,000 plant. The Hall City placer



has completed its \$60,000 plant. The Mary McKinney put up a \$60,000 plant.

The Vindicator Company expended \$40,000 in surface improvements this year. The Isabella Mine installed a \$15,000 plant of machinery, and so the cases of the proportions of the last mentioned improvements could be duplicated many times.

### IDAHO.

The McKinley Gold Mining Company, Ltd., filed articles of incorporation. Kellogg is the principal place of business. The Directors are Leonard P. Hyde, George W. Losie, Edward Hearing, Knute Holm, Alexander H. Polson, Henry C. Barnhart and Edwin Franklin. Besides the Directors, the incorporators are Thomas J. Stack, John Holm, Andrew M. Anderson, Nels C. Braham, George W. Starkey and Lewis E. Wanner. The capital stock is \$7,500, divided into 1,500,000 shares, making a par value of one-half cent per share.

### MICHIGAN.

Osceola is regarded in nearly every quarter as one of the cheapest stocks now on the bargain counter in the Boston market. Large New York interests identified with the property bought several thousand shares this year at above \$90 per share. There are only 92,000 shares of this stock outstanding. It has been paying \$6 per share from the old mill, while producing 1,000,000 pounds of copper per month.

Within a month it has put into commission a new mill that is in every respect the equal of the old one, and both mills are running. These are fed from three mines, upon the three veins of the Michigan peninsula—the Calumet vein, the Osceola vein and the Kearsarge vein.

#### Adventure Mine.

Will Leary is working in the Adventure Mine near Hancock and gives a good report of the prospects and says it is a good mine.

They are digging around a mass of copper said to be about eight feet square now. The miners are working on a contract and are making big wages. They are earning about \$4 20 a day, or about \$100 a month.

Shaft No. 1 in the Rhode Island Mine near Hancock is not working, as a new hoist and skip road is being built. They will be similar to those used at No. 7 shaft at the Quincy Mine.

At shaft No. 2 it was first necessary to go through about sixty feet of sand and they are now down about forty feet in the rock. W. H. Mason brought home samples of rock from No. 2 shaft. They were taken at random from a pile excavated from the shaft. They are the best he has seen from any of the new propositions.

He thinks the stock is cheap now and will be a good thing to lay away. The shaft is not deep enough to make a rough estimate of the percentage of the rock, but it is evidently destined to be a profitable mine.

### MISSOURI.

The year 1899 was a record-breaker for the Missouri-Kansas Mining District, both in the value of its ore output and in the prices paid for zinc ore, says the *Age of Steel*. It was the greatest in the history of the district, and

witnessed vast and wonderful improvements throughout the district, not only in the methods of mining, but in the building of new mills, and in the use of up-to-date machinery. More than 200 new mining plants were built in the district during the year, an increase of over 50 per cent, and capital from all parts of America sought investment there. Many mining corporations were organized during the year, their capital stock aggregating \$22,606,700. These corporations are all interested in zinc and lead mining in this district, and many of the older ones are paying weekly dividends.

The highest price ever paid for zinc ore was paid during the year just closed, that ore advancing to \$55 a ton, for ore in the bin, last April, and a small lot of fancy ore brought \$55.50 per ton. Zinc ore remained about \$40 until November, when it declined to \$30, but again advanced. The top price paid for this ore last week was \$36.50 per ton, a drop of 50 cents from the preceding week's price. Lead ore was steady at \$27.50 per thousand pounds, the same as for the past four weeks.

During the corresponding week of last year, zinc ore's top price was \$29.50, and lead ore brought only \$22.

Last week's out-put was considerably reduced on account of the holidays which were observed at many of the mines, and the bad condition of the roads prevented a great deal of the ore that was produced from being hauled, hence it does not appear in the week's sales.

	ZINC, LBS.	LEAD, LBS.	VALUE.
District total for last week.	7,955,080	847,300	\$160,556
District total for corresponding week last year,	9,670,080	877,580	\$118.47
District total for 1899.....	515,355,480	48,519,080	\$10,802.47

### MONTANA.

#### Anaconda Copper Company's Smelters.

There are many changes in contemplation, but not much being done outside of routine repairs. Many of the matte furnaces are being so thoroughly overhauled that it amounts to a practical rebuilding.

At these works interest centers chiefly in the new large matte furnaces that have just been built. These are three in number, and they are respectively 31, 35 and 42 feet in length, being uniformly 14 feet wide, both the length and width given being inside measurements.

These are all working well, but the best work relatively is being done by the smallest of the three—the 31-foot furnace. From this furnace some 45 or 50 tons of matte is drawn each 24 hours. It is tapped three times a day and about 15 or 16 tons drawn off at each tapping.

While the two larger furnaces are not doing quite so good work, they are constantly improving, and Captain Kelley, who is in charge of the works, has great hopes of their ultimately and at no distant day, fully equaling in relative efficiency the smaller one referred to.

It is thought that shortly after the first of the year several more of the small furnaces on the lower floor will be torn out and replaced by larger ones similar to the three already described, and that in the end there will be a complete substitution of large furnaces for small ones throughout the entire plant. There are now 23 of these smaller furnaces, their average capacity being about 12 tons of matte per day for each furnace.

The present output of matte per day from this department is about 200 tons, which is

sent directly to the converter, half a mile below, by means of a small electric railway.

Incidentally it may be mentioned that at a very early day changes will probably be made whereby the matte can be taken to the converter in a molten state, instead of pigs or bars, as at present, which will save remelting. The distance between the different parts of these vast works is so great that it has heretofore deterred efforts along this contemplated line, but in the general work of remodeling which is now in progress the purpose seems to be to make improvements wherever feasible.

This immense smelter is equipped with 96 huge Bruckner revolving furnaces for calcining the concentrates before they are sent to the matte furnaces. These Bruckners are about 18 feet in length by 10 feet in diameter, and carry 14 tons of concentrates at a charge.

The purpose of this roasting is to get rid of the most of the sulphur contained in the ore, and it is, in fact, reduced from about 35 percent to 3 or 4.

In this process, as in converting, the sulphur is a valuable agent, uniting with the oxygen of the atmosphere to form a combustion which gives the necessary heat, and makes other fuel unnecessary, except to start the fire.

This is what is called pyritic roasting, one of the most important features of copper smelting.

Sixty of these Bruckners are in the lower building and 36 in the upper.

The sixty lower Bruckners all connect with one great brick stack which stands far up on the hill above the works. This stack is said to be nearly 200 feet high from the base, with an inside diameter of 22 feet. The hill on which it stands is fully 200, and perhaps 300 feet above the valley, so that a total height of the top of the stack must be from 400 to 500 feet. The flue which connects the Bruckners with the stack is 18x20 feet in the clear.

The reader will get a better idea of the size when it is suggested that the flue would hold two trains of Pullman cars side by side.

There are two other brick stacks somewhat smaller connecting with the matte furnaces and the upper Bruckners.

A new mill has just been set up for the grinding of brickbats into clay for general use about the furnaces. The mill is about the same as those in use at the converters the grinders being two large solid iron wheels with eight-inch faces.—*Anaconda Standard*.

### NEVADA.

Wm. Yount and Jim Fisk are shipping a very high grade of copper ore from Manvel to the smelter. The ore comes from Good Springs District, Nevada.

### NEW MEXICO.

J. M. Wines made the last payment on \$13,000 on the Superior Mine, near Lordsburg, a few days ago. The company has realized sufficient on the ore taken out of the mine during the term of the bond and lease to pay for it. With new hoist and other appliances, the owners will now sink and open other workings.

Some beautiful specimens of gold and copper ore have been taken from the Providence near San Pedro, Santa Fe County. Ore taken from the prospect assays \$38 in gold, and carries a good per cent of copper. Only



33 feet of assessment work has been done, and an offer of \$1,000 has been refused for it.

The Hillsboro District is slowly but surely coming to the front again as a producer of gold. A recent assay of some ore found within a dozen miles of the town showed values amounting to \$56,000 per ton. The tests were made by a well known assayer of Hillsboro, Mr. Preisser.

The owners of the Surprise Mine at Cook's Peak, two weeks ago, opened up a pocket of lead carbonates, which promises to develop into a big strike. The ore body was found close to the Taylor cave. The work of opening up the new body is now under way.

A strike of copper ore was made last week, near Pinos Altos, by Dr. L. B. Robinson and associates in the Pilipino Mine. The vein is fully two and a half feet wide, and the ore assays 9 per cent copper and \$1.20 gold per ton.

### SOUTH DAKOTA.

The Homestake-Highland Company has paid a total in dividends of \$8,143,750 since the first dividend was paid. For the year 1899 the sum of \$962,500 was given the stockholders. About 2,800 tons of ore have been mined, and milled daily through the year. Improvements have been made everywhere with the idea in mind of saving the values in the ore. The Highland hoisting plant is practically completed and can be operated from now on. Experiments were conducted during the summer upon the tailings from the mills with the cyanide process and the company was convinced that a large per cent of the remaining values could be saved in this way and a mammoth cyanide plant has been commenced.

#### State Mine Inspector's Report.

The following are the amounts produced by each of the following companies, as given in the State Inspector of Mines' report for 1899:

Homestake .....	\$2,684,336
Highland .....	936,000
Horseshoe .....	562,000
Holy Terror .....	900,000
Hidden Fortune .....	200,000
Golden Reward Chlorination Works .....	648,000
Blacktail Mines .....	60,000
Golden Reward Smelter .....	2,300,000
Rapid City Chlorination Works .....	24,000
Allen, Small and Associates, Cyanide Plant .....	19,000
Spearfish Cyanide Plant .....	63,000
J. R. Mill .....	6,000
Central City Cyanide Plant .....	8,000
Cochran Mill .....	9,000
Placer Mines .....	12,000
Other Mines and Mills .....	10,000
Ore Shipped East .....	700,000
Total .....	\$8,841,336

### UTAH.

#### Utah's Gold and Silver Product 1869-1899.

YEAR	GOLD	SILVER
1869 .....	\$600,000	
1870 .....	300,000	\$1,000,000
1871 .....	221,000	2,079,000
1872 .....	100,000	2,345,279

YEAR	GOLD	SILVER
1873 .....	52,426	3,725,775
1874 .....	92,093	3,819,508
1875 .....	181,765	2,955,923
1876 .....	164,832	3,872,519
1877 .....	17,325	4,359,703
1878 .....	15,040	4,357,328
1879 .....	15,932	3,835,047
1880 .....	8,020	3,783,566
1881 .....	7,958	5,400,191
1882 .....	9,039	5,435,444
1883 .....	6,991	4,531,763
1884 .....	5,530	5,669,488
1885 .....	8,903	5,972,689
1886 .....	10,577	5,918,842
1887 .....	11,387	6,161,737
1888 .....	13,886	6,178,855
1889 .....	24,975	7,147,651
1890 .....	33,851	8,165,586
1891 .....	36,160	8,015,223
1892 .....	38,182	8,969,656
1893 .....	54,072	7,107,503
1894 .....	56,427	6,659,798
1895 .....	65,418	8,223,804
1896 .....	92,044	8,250,233
1897 .....	89,297	6,689,753
1898 .....	114,766	6,570,255
1899 .....	346,320	4,641,748

### FOREIGN MINING NEWS

#### BRITISH COLUMBIA.

##### NELSON.

The following is the mill run at the Atha basca for one month: Number of days run, 29 days, 3 hours; number of tons crushed, 338.

Value of bullion recovered..... \$9203 03  
Gross value of concentrates recovered..... 2,385 25

Total..... \$11,588 28

Value of bullion recovered per ton of ore crushed..... \$23 72

Gross value of concentrates recovered per ton of ore crushed ..... 6 14

Total values recovered per ton of ore crushed ..... 29 86

The Custom returns from Nelson for one month include the following exports:

	VALUE.
Coke .....	\$ 339
Lead bullion .....	36,513
Gold bullion .....	48,095

The result of the Hall Mines smelting operations for five weeks are as follows:

Smelter in blast 19 days and 13 hours, during which time 128 tons of Silver King ore (containing approximately 1,540 ounces of silver) and 368 tons of purchased ores were smelted; 103 tons of lead bullion were produced, containing (approximately) 102 tons of lead, 11,330 ounces of silver and 387 ounces of gold.

The output of mines of East and West Kootenay for the eleven months ending November 30th approximates in value \$5,500,000 in gold, silver, lead and copper. The total for the year will be in the neighborhood of \$6,000,000.

##### SLOCAN.

The exports of ore from the ports of Kaslo during one month made a very insignificant showing, and the aggregate tonnage was less than during any similar period since the construction of the railway in that district. The returns are as follows: 570,585 lbs., containing 298,798 lbs. lead and 16,926 oz. silver.

### MEXICO.

Report says that the Captain Mine, in the Gold Gulch District, Sonora, has been sold for \$200,000. This is one of the free-milling gold propositions that has attracted special attention in that section.

The Cananea Consolidated Mining Co., of Sonora propose constructing a grade from their mines to the reduction works some fifteen miles distant. It is also their intention to build a railroad from Naco, Cochise County, Arizona, to their mines, a distance of 40 miles.

### Latest Mining Decisions.

Prepared for THE MINING AND METALLURGICAL JOURNAL, by Andrews & Murdoch, Berrien Springs, Michigan. Credit must be given when reprinted.

The owner of a town lot in Alaska, unpatented, may adverse an application for patent for a lode claim, and may maintain an action in a court of competent jurisdiction in support of such adverse. Young et al. vs. Goldsteen, 97 Fed. Rep. (U. S.) 303.

Under Pol. Code, §3612, providing that the declaratory statement containing a description of a mining claim filed with the County Clerk must contain the location and description of each corner, with the markings thereon, a statement describing a claim by metes and bounds, and giving no description of the corners or the markings thereon, is invalid. Purdum vs. Laddin et al. 59 Pac. Rep. (Mont.) 153.

The Act of Congress of May 17, 1884, providing a civil government for Alaska, also provides that "the Indians or other persons in said district shall not be disturbed in the possession of any lands actually in their use or occupation or now claimed by them, but the terms under which such persons may acquire title to such lands is reserved for future legislation by Congress." By this provision all persons in peaceable possession of lands in Alaska on the date of said act are guaranteed the right to ultimately acquire a perfect title to such lands through such legislation as the Congress may enact for that purpose. Young et al. vs. Goldsteen, 97 Fed. Rep. (U. S.) 303.

Rev. St. § 2324, as amended by Act of Jan. 22, 1880 (21 Stat. 61), provides that the miners of a district may make regulations, not in conflict with the laws of the United States, governing the location, manner of recording, and amount of work necessary to hold possession of a mining claim, subject to the requirement that not less than \$100 worth of labor shall be performed or improvements made during each year until a patent has been issued, and further providing by the amendment that "the period within which the work required to be done annually on all unpatented mineral claims shall commence on the first day of January succeeding the date of location on such claim," merely fixes the minimum amount of expenditure exacted by the United States, and the maximum limit of the time within which it may be made, leaving to the States and mining districts to prescribe such further regulations or requirements within such limits as they may deem advisable; and a mining district has power to make a regulation requiring a prescribed amount of work to be done within 90 days after a location is made, and making the claim subject to relocation in default of such



work, notwithstanding the 90 days may expire before the 1st day of January succeeding the date of location. *Northmore vs. Simmons et al.*, 97 Fed. Rep. (U. S.) 386.

A mineral discovery made on free public land, and a claim located thereon, vest in the locators all the free public land within its limits, and every vein whose apex is found within such free public land, within the surface lines of the claim extended downward vertically, whether the surface thus secured is all or only part of the tract within the boundary lines of the claim. *Crown Point Min. Co. vs. Buck*, 97 Fed. Rep. (U. S.) 463.

On page 94 of this issue, in the article "The Metallurgy of Gold," Prof. L. J. Stabler's name was misspelled. Through a typographical error "s" was inserted instead of "r."

The M. C. Bullock Manufacturing Co., of Chicago, has closed orders for hoisting machinery for the Spring Valley Coal Co., and the Spruce Mining Co. It has also sent a diamond drill to Northern Minnesota, and closed a contract for diamond drill prospecting on the Pacific coast of old Mexico.

A close approximate of the Credentials Committee showed that at least eighteen States were represented in the National Convention of the United Mine Workers of America when that body convened in Indianapolis today. The wage question will be the paramount consideration. Some of the districts have already framed their demands.

The following table showing Colorado's mineral production, includes only precious metals and metals carried with them. It does not include iron, etc.

In four of the metals produced from Colorado mines the State presents new records for value. The metals in point are gold, lead, copper and zinc. The exception is silver, which was more affected by the smelter shutdown last summer than any of its sister products, as the shipments of ores from the leading silver districts were almost totally suspended between June 15th and the middle of August.

Gold, 1,515,777 ounces at \$20.67.....	\$31,329,056
Silver, 21,275,532 ounces at 59.6 cents.....	12,680,256
Lead, 54,350 tons at \$85.40 per ton.....	4,641,529
Copper, 11,516,931 pounds at 16.1 cents.....	1,855,226
Zinc and manganiferous iron.....	577,500
<b>Total for 1899.....</b>	<b>\$51,082,567</b>

## PERSONAL NEWS ITEMS

H. B. VERCOE, Mining Engineer, is in London, England, on important mining business.

J. R. DILLON, President of the Jerome, Arizona, Copper Company, is examining mining property in Mexico.

T. W. PAYNE, General Manager of the Grand Reef Mine, has returned from New York to Wilcox, Arizona.

JOSEPH S. WOODRUFF is traversing Oregon and Washington, collecting mineral specimens for the Paris Exposition.

CHARLES R. WARDLE of New York is en route home from an examination of mining properties in Northern California.

A. J. BAYS of Juneau has been appointed Deputy United States Marshal at Cape Nome. He will go this winter over the ice.

A. F. HOLDEN, President of the Centennial-Eureka Mining Company, Utah, has gone to Costa Rica to inspect mining properties there.

LEO VON ROSENBERG has returned to New York City from California, after examining mining properties in California, Arizona and New Mexico.

W. M. THORNTON is in San Francisco, en route to Anaconda, Montana, from the Philippines, whose mineral resources he thinks will be worth developing by American miners after peace has been restored.

WILLIAM H. NUTTING of Colorado, will superintend the construction of the pyritic smelter from which the ores of the Bingham Copper and Gold Mining Company at Bingham, Utah, are to be reduced.

FREDERIC KEFFER, representing very large New York interests, is manager of the British Columbia Copper Company, Limited, owning the Mother Lode group of mines in the Boundary Creek District, British Columbia.

R. C. CLUTE, Q. C., acting as special Commissioner for the Dominion Government, has, during the past month, conducted inquiries in Sandon, Nelson, Rossland and other mining centers, respecting the operation of the eight-hour law in the Kootenays, British Columbia.

According to W. A. CARLISLE's first reports the average value per ton of Rossland ores amounted to \$40.69. In 1898 this is given as \$22.80 per ton, and for 1899 it is estimated at \$18.00, though it may reach \$20.00, as the smelter returns will not be completed until February.

EDGAR A. BENNETT, general manager in British Columbia of the Lilloet, Fraser River and Cariboo Gold Fields, Limited, and of the Sunshine, Limited, owning the Silver Cup and adjoining properties in the Trout Lake District, some time ago resigned his position with these companies and is leaving for England on February 1st. M. Bennett's resignation takes effect on the 31st January.

GOVERNOR THOMAS has appointed the following delegates to represent Colorado at the International Mining Congress in Milwaukee, next June: H. A. LEE, W. S. STRATTON, ALVA ADAMS, W. F. BUCKLEY, JAMES DOYLE, JOHN R. MCKINNEY, FRANK M. WOODS, J. F. BURNS, W. S. MONTGOMERY, CLARK W. ROE, VICTOR G. HILLS, C. J. MOORE, A. V. BOHM, C. T. CARRAHAN, HENRY I. HIGGINS, S. J. SULLIVAN, FRANCIS CARNEY, T. S. WALSH, F. H. CANE, GEORGE S. NEWMAN, S. I. HALLACK, FRANK E. WHEELER, D. A. TARRELL, E. J. ELLIOTT, JAMES H. ROBIN, E. G. STOEIBER, W. Z. KINNEY, S. V. NEWELL, W. H. GRAVES, CHARLES FAINTER, MEAD HAMMOND, J. A. MINOR.

## NEW INCORPORATIONS IN THE MINING AND METAL INDUSTRIES.

### CALIFORNIA.

Blue Wing Oil Co., San Francisco. Mining business. Capital, \$100,000. Incorporators: G. F. Beveridge, G. C. Gurnett, W. Wardlaw, T. E. Norris, all of San Francisco; G. H. Waggaird, of Alameda.

Sunset Development Co., San Francisco. General mining business. Capital, \$200,000. Incorporators: E. C. Wright, G. T. Klink, F. Walker, W. Surger, Jr., P. A. Douty, all of San Francisco.

Star Oil Co., San Francisco. Mining business. Capital, \$500,000. Incorporators: K. S. Elwood, J. M. Keith, J. J. Mack, C. White, G. G. Carter, all of Bakersfield.

Jose Copper Mining Co., Hollister. General mining business. Capital, \$40,000. Incorporators: G. McConnell, R. Jose, J. Caffney, N. C. Briggs, G. W. Clark, all of Hollister.

Caspian Oil Co., Fresno. Mining business. Capital, \$100,000. Incorporators: C. A. Canfield, J. A. Chancellor, of Coalinga; W. H. McKenzie, T. G. Hart, G. L. Hoxie, J. Streeter, all of Fresno; E. C. Miller, of Visalia, and others.

Keystone Mining Co., Grass Valley. General mining business. Capital, \$25,000. Incorporators: H. A. Fairbanks, J. M. Thomas, J. J. Hosken, W. D. Harris, all of Grass Valley; J. H. English, of Nevada City.

Alma Sola Petroleum Co., San Francisco. Mining business. Capital, \$500,000. Incorporators: T. L. Platt, M. T. Dugan, P. H. Seeley, A. Neilson, C. Bronson, G. A. Treadwell, F. W. Mayberry, all of San Francisco; A. S. J. Woods, of Berkeley.

Juarez Mining Co., Los Angeles. General mining business. Capital, \$200,000. Incorporators: H. T. Duff, J. A. Pirtle, G. Hanna, of Los Angeles; E. A. Phillips, of San Bernardino; S. W. Pearce, of San Diego.

Victory Oil Co., San Francisco. Mining business. Capital, \$100,000. Incorporators: W. B. Lee, W. A. Deane, W. B. Fowler, D. Mackintosh, J. E. Firmstone, all of San Francisco.

Excelsior Oil Co., San Francisco. Oil business. Capital, \$350,000. Incorporators: G. W. Merritt, C. H. Phillips, H. Murphy, E. Lewis, J. W. Wright, of San Francisco.

California Mutual Oil Co., San Francisco. Mining business. Capital, \$500,000. Incorporators: G. M. Perine, W. H. Busch, E. B. Potter, W. S. Pardy, F. Reis, Jr., all of San Francisco.

American Fuel Oil Co., Los Angeles. Mining business. Capital, \$100,000. Incorporators: G. Easton, G. D. Baston, W. L. Valentine, E. H. Groemen-dyke, C. A. Welte, all of Los Angeles.

Pacific Oil Mining and Development Co., San Francisco. Capital, \$500,000. Incorporators: P. Cutting, F. P. Cutting, both of Oakland; G. C. Alleritz, A. D. Cutter, C. F. Jackson, all of San Francisco; T. H. Gancard, F. E. Lane, O. T. Henderson, all of Stockton; J. P. Iscart, of Los Angeles.

Sunset Oil Mining and Development Co., San Francisco. Mining business. Capital, \$500,000. Incorporators: A. J. Rausch, R. Schult, G. C. Alleritz, A. Rusch, all of San Francisco; P. L. Cavala, J. P. Iscart, of Los Banos; F. Cutting, of Oakland.

Lincoln Gold and Silver Mining Co., Grass Valley. General mining business. Capital, \$50,000. Incorporators: J. R. Tyrrell, J. H. Coughlin, of Grass Valley; P. McAusland, J. V. Snyder, of Nevada City; F. A. Sieke, of Sacramento.

Michigan Bluff Mining Co., Auburn. General mining business. Capital, \$30,000. Incorporators: M. T. Lawrence, W. B. Lardner, R. F. Burns, W. J. Burns, all of Auburn; W. H. Burns, I. A. Burns, of Michigan Bluff.

Equitable Oil Co., San Francisco. Mining business. Capital, \$500,000. Incorporators: M. A. C. Christein, J. Karstensen, J. H. Sayre, L. Bowles, C. Bone, all of San Francisco.

Hidden Treasure Oil Co., San Francisco. Mining business. Capital, \$100,000. Incorporators: L. C. Higgins, H. F. Heart, B. D. Kimmons, W. W. Kaufman, all of San Francisco; C. H. Wiggoner, of Alameda.

Westlake Rommel Oil Co., Los Angeles. Mining business. Capital, \$250,000. Incorporators: H. W. Westlake, J. Rommel, B. Kohlmeier, B. M. Marble, all of Los Angeles; A. Gardner, G. P. Phibbs, of Colegrove.

Orange County Oil Co., Santa Ana. Mining business. Capital, \$60,000. Incorporators: I. E. Stanley, B. C. Baker, J. P. Williams, D. J. Hoge, all of Villa Park; R. Y. Williams, W. A. Beckett, both of Santa Ana.

Ninety-Nine Oil Co., Oakland. Mining business. Capital, \$100,000. Incorporators: M. McWhorter, of McKittrick; S. Gale, of Berkeley; D. D. Stark, A. J. Samuel, J. A. Stroud, W. E. Knowles, Jessie B. Stroud, all of Alameda; J. M. Bartlett, of Oakland.

Marietta Oil Co., Oakland. Mining business. Capital, \$5,000. Incorporators: M. McWhorter, C. E. Brisco, of McKittrick; A. J. Samuel, of Alameda; W. E. Knowles, L. J. Shuman, both of Oakland.

Pennsylvania Consolidated Oil Co., San Francisco. Mining business. Capital, \$500,000. Incorporators: J. H. Dieckmann, of Oakland; J. Simon, B. F. Beck, J. B. Toplit, all of San Francisco; B. F. Shepherd, of Fresno.

Tres Sierritas Oil and Mining Co., Lemoore. Mining business. Capital, \$200,000. Incorporators: A. McGlashen, J. F. Smith, L. H. Brown, H. Jenkinson, J. Freer, T. Finncane, K. W. Jones, all of Lemoore.

Sunrise Oil and Mining Co., Bakersfield. Mining business. Capital, \$100,000. Incorporators: E. J. Emmons, C. Scribner, E. R. Guild, Mrs. E. M. Kernard, E. B. Davis, L. M. Underwood, J. Jemenes, C. Lorenson, J. Elder, E. C. Kane, W. H. Emmons, all of Bakersfield.

Americus Gravel Mining Co., San Francisco. Mining business. Capital, \$200,000. Incorporators: S. L. Leszynsky, F. W. Page, F. L. Leszynsky, M. J. Koshland, G. Leszynsky, all of San Francisco.

Sacramento Land and Development Co., Sacramento. Mining business. Capital, \$9,000. Incorporators: M. J. Curtis, J. L. Gillis, F. W. Whitmore, J. J. Henderson, J. H. Batchler, C. K. Lipman, R. M. Richardson, all of Sacramento.

Sparks Mining Co., San Francisco. Mining business. Capital, \$1,000,000. Incorporators: T. J. Sparks, H. B. M. Sparks, J. Curtin, W. J. Bartuett, S. Goodenough, all of San Francisco.

Commodore Gold Mining Co., Stockton. Mining business. Capital, \$100,000. Incorporators: E.



Rignell, of Lincoln, Neb.; F. Y. Robertson, of Kearney; L. R. Robertson, W. M. Garnett, P. B. Spears, all of Los Angeles.

Zubiate Mining Co., San Francisco. Mining business. Capital, \$2,000,000. Incorporators: D. E. Oliver, H. A. Belhume, J. P. Pryor, all of San Francisco; A. Thornton, of New Hope; W. G. Langdon, of Oakland.

Ritter Quartz Mine, San Francisco. Mining business. Capital, \$100,000. Incorporators: M. C. Rigney, I. Thexton, both of Oakland; R. H. Daley, P. I. Rigney, J. Thexton, all of San Francisco.

Fresno County Oil Co., Selma. Mining business. Capital, \$300,000. Incorporators: J. Brownstone, H. B. Corbett, A. B. Armstrong, A. M. Troy, E. H. Tucker, all of Selma, and others.

Highland Oil Co., Fresno. Mining business. Capital, \$200,000. Incorporators: T. G. Hart, L. L. Cory, A. Harvey, P. A. Henest, T. M. Martin, J. A. McClurg, Sr., Susan I. Braly, E. H. Clark, all of Fresno; F. Clark, H. A. Whitely, both of San Francisco.

National Oil Co., Oakland. Mining business. Capital, \$100,000. Incorporators: W. C. Beatie, W. E. Knowles, L. J. Shuman, J. B. Stroud, all of Oakland; J. H. Wood, of Stockton.

River View Oil Co., Santa Cruz. Mining business. Capital, \$50,000. Incorporators: J. M. Martin, of Fresno; J. R. Martin, J. H. Logan, H. Holway, H. R. Irish, all of Santa Cruz.

Salmon River Consolidated Gold Mining Co., San Jose. Mining and milling business. Capital, \$50,000. Incorporators: G. Roberts, W. M. Cooper, W. A. Cooper, H. J. Sheldon, W. Gussfeldt, S. R. Johnson, all of San Jose; E. E. Potter, of San Francisco.

Union Exploration Co., San Francisco. Mining and milling business. Capital, \$200,000. Incorporators: C. C. Leavett, W. C. Leavett, W. H. Sigourney, J. H. Boden, all of San Francisco; H. Endey, of Jackson.

#### COLORADO.

Columbia and Cripple Creek Mining Co., Colorado Springs. Mining business. Capital, \$2,050,000. Incorporators: H. C. McCreery, F. J. Steinmetz, A. B. Brisbur, J. C. Plumb, F. H. Heribert, E. T. Creighton, E. E. Nichols, W. R. Barnes, all of Colorado Springs.

Caribou Mining Co., Leadville. Mining business. Capital, \$100,000. Incorporators: W. B. Page, K. L. Fahnestock, S. W. Mudd, all of Leadville.

Little Richard Co., Milwaukee, Wis. Mining business. Capital, \$2,000,000. Incorporators: W. A. Starke, of Milwaukee; J. D. Caldon, J. J. Webber, both of Colorado Springs; A. L. Enright, of Idaho Springs; O. A. Fincke, of Milwaukee, Wis.

Gravel Mountain Gold Mining and Placer Co., Boulder. Mining and placer business. Capital, \$75,000. Incorporators: W. G. Houston, C. G. Maynard, R. T. Fulton, all of Boulder.

Coppertown Mining and Smelting Co., Denver. Mining and smelting business. Capital, \$250,000. Incorporators: A. L. Briggs, W. S. Martin, H. Potvin, all of Denver; F. Bridges, C. H. Street, T. W. Meade, all of San Francisco.

Providence Mining Co., Buena Vista. Mining business. Capital, \$100,000. Incorporators: G. Robinson, of Turret, Col.; E. T. Petty, of Barre, Vt.; E. B. Petty, J. B. Garretson, B. C. Miller, all of Buena Vista.

Pilgrim Gold Mining and Milling Co., Leadville. Mining business. Capital, \$50,000. Incorporators: J. C. Stephens, F. E. Bouck, I. H. Shelton, Alice W. Tiffany, D. Bonner, all of Leadville.

San Fernanda Mining and Milling Co., La Veta. Mining business. Capital, \$100,000. Incorporators: W. C. Fowler, S. E. Hoge, L. Capro, all of La Veta.

Lucky Leasing Co., Denver. Mining business. Capital, \$2,000. Incorporators: L. A. Hayes, F. E. Gregg, G. A. Yarger, all of Denver.

Blake-Harvey Mining Co., Leadville. General mining business. Capital, \$50,000. Incorporators: H. M. Blake, A. S. Harvey, F. K. Porter, all of Leadville.

Live Wire Mining Co., Colorado Springs. General mining business. Capital, \$1,500,000. Incorporators: C. Hill, G. S. Parker, both of Colorado Springs; J. Wood, of St. Louis, Mo.

Parral Milling Co., Denver. Milling business. Capital, \$300,000. Incorporators: B. Gilpin, Jr.; J. F. Hopkins, A. B. Seaman, N. H. Emmons, J. M. Bottello, all of Denver.

Bourbon Lead & Zinc Co., Denver. Lead and zinc mining. Capital, \$40,000. Incorporators: I. N. Ury, W. Chenault, D. F. Campbell, J. V. Stacy, J. W. Tate, H. W. Pond, H. B. Adams, all of Denver.

Silver Lake Milling & Mining Co., Boulder. Mining business. Capital, \$200,000. Incorporators: W. P. Stewart, D. C. Hewitt, E. P. Nellis, all of Boulder.

Ahurdix Gold Mining & Milling Co., Pueblo. Gold mining business. Capital, \$1,000,000. Incorporators: G. W. Avery, S. J. Burns, J. R. Dixon, W. C. Poshon, L. A. Winters, B. Bergerman, G. G. Withers, all of Pueblo.

Arapahoe Gold & Copper Mining Co., Denver. Gold and copper mining. Capital, \$600,000. Incorporators: L. D. Loughl, W. B. Harrison, J. S. Riggs, D. M. Kennedy, B. B. Clapp, all of Denver.

#### DELAWARE.

Silver King Gold Mining and Milling Co., Wilmington. Mining business. Capital, \$500,000. Incorporators: J. W. Royer, A. Stewart, both of Spokane; P. S. Myers, W. J. Payne, A. W. Winn, all of Richmond, Va.

Algoma Mining Co., Wilmington. General mining business. Capital, \$200,000. Incorporators: O. H. Scheidemantel, of Staten Island; J. Bamford, of Brooklyn; B. P. Burrill, of Westfield, N. J.; J. L. Coverhill, of Toronto, Canada.

Hamilton Mining & Milling Co., Dover. Mining and milling business. Capital, \$100,000. Incorporators: C. V. Hamilton, L. C. Hamilton, H. H. Newton, all of Pittsfield, Mass.

Gold Pan Mining Co., Wilmington. Mining business. Capital, \$1,250,000. Incorporators: McGeorge Bundy, S. A. Sears, C. L. Lockwood, P. H. Travis, all of Grand Rapids, Mich.; M. E. Smith, of Wilmington, Del.

Anglo-Columbian Exploration Co., Dover. Mining business. Capital, \$5,000,000. Incorporators: E. M. Henry, J. J. Roach, both of Brooklyn, N. Y.; J. L. Wolcott, of Dover, Del.

#### ILLINOIS.

Indian Mining Co., Chicago. Mining business. Capital, \$2,500. Incorporators: C. E. Hallstrom, T. Cullotin, H. Magnus, all of Chicago.

Tropic Mining Co., Chicago. Mining and milling business. Capital, \$2,000. Incorporators: L. L. Smith, A. J. Rooney, J. J. Rooney, all of Chicago.

Marshall Mining & Milling Co., Chicago. Milling and mining. Capital, \$15,000. Incorporators: F. M. Abbott, F. Marshall, M. E. Cooke, all of Chicago.

#### MAINE.

Aztec Gold & Copper Mining Co., Waterville. Mining business. Capital, \$2,000,000. Incorporators: D. W. Williams, of Glastonbury, Ct.; C. A. Holland, of Quincy; T. Wentworth, H. F. Doble, W. W. Brookings, all of Boston; P. E. Chandler, of Medford; L. B. Jordan, of Malden; C. W. Davis, of Waterville.

Big Cottonwood Copper & Gold Mining Co., Portland. Mining business. Capital, \$1,500,000. Incorporators: N. Tremick, of Salt Lake City; W. L. Pratt, of Melrose, Mass.; C. H. Talman, of Portland, Me.

#### MISSOURI.

Helmet Mining Co., Kansas City. Mining business. Capital, \$25,000. Incorporators: K. B. Armour, L. E. James, C. S. Pitkin, F. Hagerman, all of Kansas City, Mo.; C. W. Armour, of New York.

Baltimore Mining Co., Kansas City. Lead and zinc mining. Capital, \$2,500. Incorporators: W. W. Fagan, H. G. Wilson, C. J. Trowbridge, J. C. Wingert, C. J. Simpson, all of Kansas City.

United States Lead & Zinc Mining Co., St. Louis. Mining and smelting. Capital, \$100,000. Incorporators: Marv E. Leahy, D. P. Leahy, A. R. Schrollmeyer, C. Mueller, C. C. English, C. Hamilton, all of St. Louis.

A Number One Mining Co., Joplin. General mining business. Capital, \$200,000. Incorporators: G. E. Starr, T. Morgan, J. H. Myers, all of Joplin, Mo.; C. W. Thomson, of St. Clair, Mich.; A. L. Johnson, of Muncie, Ind.

Saw Tooth Placer Mining Co., Kansas City. General mining business. Capital, \$300,000. Incorporators: H. J. Prange, of Chanute, Kan.; L. E. Moses, of Pueblo, Col.; W. A. Moses, S. E. Moses, W. M. Ryerson, all of Kansas City.

Batavia Mining Co., Carthage. Mining business. Capital, \$50,000. Incorporators: R. F. Glenn, F. G. Stuart, all of Carthage; T. C. Moulding, B. A. King, both of Chicago, Ill.; I. S. Stephens, H. N. Wade, both of Batavia.

Regina Lead & Zinc Mining Co., Joplin. Lead and zinc mining. Capital \$20,000. Incorporators: J. R. House, of Joplin; G. Campbell, A. W. Imrie, A. D. Holmes, J. P. Hartz, W. T. Metcalf, all of Detroit, Mich.

East Sherwood Lead & Zinc Co., Joplin. General mining business. Capital \$100,000. Incorporators: W. W. Gregg, L. P. Cunningham, T. Dolan, all of Joplin; C. W. Somers, of Cleveland, O.

#### NEW JERSEY.

Catiba Placer Mining Co.—Principal office, No. 86 Montgomery Street, Jersey City, N. J. Mining. Capital, \$100,000. Incorporators: Edgar L. Brown, John B. Berthoff, Michael I. Fagen, all of Jersey City.

Mount Moriah Mining Co.—Principal office, New Jersey Registration & Trust Co. Building, East Orange, N. J. Mining. Capital, \$125,000. Incorporators: S. F. McDowell, W. F. Kaplmyer, W. C. Jones, S. F. Hever, C. N. Andrews, C. N. Cameron, Franklin Ely, D. R. Campbell, F. M. Chapman, Andrew Nelson.

#### NEW YORK.

Mariana Mining Co., New York City. Mining business. Capital, \$100,000. Incorporators: A. M. Sayer, Mary M. Sayer, F. R. Steven, C. A. Burbank, all of New York City; M. H. Goodwin, of Brooklyn.

Camden Mining Co., New York City. Mining zinc, etc. Capital, \$15,000. Incorporators: W. J. Wilkes, of Kansas City, Mo.; E. T. Brookman, W. E. Kesselburgh, Jr., both of New York City; H. Brook, of Albany.

#### OHIO.

A. R. Elson Co., Magnolia. Milling business. Capital, \$20,000. Incorporators: A. R. Elson, Margaret E. Elson, J. R. Elson, P. Elson, R. Elson.

Pittsburg-Ohio Coal Co., Cleveland. Mining business. Capital, \$10,000. Incorporators: H. B. McGraw, E. M. Grovemyer, H. C. Fosel, L. M. Hildereth, J. W. Hart.

#### TENNESSEE.

Hewassee Mining Co., Knoxville. General mining business. Capital, \$5,000. Incorporators: C. A. Weller, H. V. Maxwell, J. A. Fowler, W. Taylor, E. T. Sanford, all of Knoxville.

#### WEST VIRGINIA.

Binghamton Zinc and Lead Mining Co., Binghamton, N. Y. Mining and milling business. Capital, \$1,000,000. Incorporators: E. F. Jones, M. W. Scott, J. W. Cobb, O. E. Briggs, M. A. Miller, all of Binghamton.

Grafton Mica Milling and Manufacturing Co., Boston, Mass. Mining and manufacturing business. Capital, \$100,000. Incorporators: E. D. Harris, of Reading; C. F. Woodward, A. E. Stone, of Wakefield; S. E. Knight, of Lynn; F. B. S. Robbins, of Melrose.

Glade Creek Coal Co., Charleston. General coal and coke business. Capital, \$5,000,000. Incorporators: C. E. Platt, F. Maurer, E. Daly, W. J. Jackson, A. T. Dukes, all of Philadelphia.

Chicago & Sitka Gold Mining & Milling Co., Chicago, Ill. Mining and milling business. Capital, \$2,000,000. Incorporators: H. A. Bauer, of Seattle, Wash.; J. W. Lowenthal, C. C. Moeller, A. H. Wolf, S. Stein, all of Chicago, Ill.

Alaska & Northwest Exploration Co., New York City. Mining and milling business. Capital, \$5,000,000. Incorporators: J. R. Jeane, M. S. Bowell, T. J. Taylor, of Cedarhurst; B. M. Baruch, C. B. Davidson, of New York City.

Digby Mill & Mining Co., Joplin, Mo. General mining and milling business. Capital, \$200,000. Incorporators: H. J. Mendel, G. T. Digby, J. Crackard, A. S. Hare, all of Wheeling; E. M. Statler, of Buffalo, N. Y.; W. J. H. Bown, of St. Louis.

Pittsburg Mexican Mining Co., Pittsburg. Mining and milling business. Capital, \$1,000,000. Incorporators: T. H. Lohr, H. Lively, M. G. Livingston, W. C. Lilly, T. R. Kenney, all of Pittsburg.

Missouri Zinc & Lead Concentrates Co., Springfield, Mass. Mining and milling business. Capital, \$400,000. Incorporators: Laura Newman, R. P. Alden, H. Bowman, F. T. Ley, B. A. Carter, all of Springfield, Mass.

Westchester Zinc & Lead Co., White Plains. Mining and milling business. Capital, \$150,000. Incorporators: H. T. Jennings, E. C. White, both of Mt. Vernon; J. W. Lounsbury, of Port Chester; J. H. Moran, of White Plains; W. R. Bull, of Harrison.

Sangamore Zinc & Lead Co., Galena, Kan. Milling and mining business. Capital, \$500,000. Incorporators: B. Pitman, F. M. Smith, both of Lynn, Mass.; L. F. Mendall, of Wrentham; I. S. Franklu, G. H. Drew, both of Boston.

Hampton Zinc & Lead Co., Springfield. Mining and milling business. Capital, \$150,000. Incorporators: E. A. Snowman, J. F. Carman, T. G. O'Connell, G. C. Tait, N. B. Russell, all of Springfield, Mass.



# The Mining And Metallurgical Journal

## THE MARKETS.

All quotations, financial reports and other statistical figures given under this head are New York Quotations, unless otherwise stated in each item. These figures are carefully revised each issue, and constitute a very accurate compilation of statistical matter.

### METALS

The following are the Silver, Copper, and Lead quotations for the last two weeks

	SILVER.	COPPER.	LEAD
Jan 1	58 3/4	16 50	4 75
" 2	58 3/4	16 50	4 75
" 3	58 3/4	16 50	4 75
" 4	58 3/4	16 50	4 75
" 5	58 3/4	16 50	4 75
" 6	58 3/4	16 50	4 75
" 7	58 3/4	16 50	4 75
" 8	58 3/4	16 50	4 75
" 9	58 3/4	16 50	4 75
" 10	58 3/4	16 50	4 75
" 11	58 3/4	16 50	4 75
" 12	58 3/4	16 50	4 75
" 13	58 3/4	16 50	4 75
" 14	58 3/4	16 50	4 75
" 15	58 3/4	16 50	4 75
" 16	58 3/4	16 50	4 75
" 17	58 3/4	16 50	4 75
" 18	58 3/4	16 50	4 75
" 19	58 3/4	16 50	4 75
" 20	58 3/4	16 50	4 75

### SILVER

The Silver market has been steady and dull showing only small fractional changes during the week and closing at 26 3/4 d. in London.

### COPPER.

Prices remain unchanged from those quoted last week. Lake copper 18 1/2c. Electrolytic in cakes, wirebars and Ingots 17 @ 17 1/2. Cathode 16 1/2 @ 16 3/4c. casting copper 17c nominal. The foreign market is still dominated by difficulties betw. England and Transvaal. London

is quoted English tough £78 3 s. 6 d. 179 5s. best selected £80 7s. 6 d. 180 1s. India sheets £80 1s. 10s.

### LEAD

Lead continues in good demand and with no change in prices. New York being quoted at 4.55@4.60c.

The foreign market has been irregular but the tendency is upwards. Spot is quoted at £15 17s 6d @ £16 2s 6d for Spanish and £16 5s @ £16 7s 6d for English, while futures are at a discount of 5s to 10s.

### SPIRIT

The disquieting news from the ore-fields stirred up consumers and a good business has resulted at stiffening prices. New York is quoted at 5.45@5.50.

The foreign market is also firmer and again higher good ordinaries being quoted at £22 12 6d. Specials £22 17s 6d.

### ANTIMONY.

Antimony is in good demand. We quote Cooksons at 10 1/2 @ 11. Ballott's at 9 1/2 @ 9 3/4. U. S. Star and Hungarian 7 1/2 @ 9 1/2c.

### NICKEL.

Nickel continues unchanged and no alternation of prices can be reported. We quote for ton lots 33 1/2 @ 36c. per lb., and for smaller orders 35 1/2 @ 38c. London prices are 14 1/2 @ 16d. per lb., according to size of order.

### TIN.

It is quite natural that this article, which is always volatile should suffer in consequence of the unsettled state of affairs abroad and the higher money market. Fluctuations have been rather wide but the close is again firm at £145 15s for spot and £146 2s 6d for three months.

In New York the buying was restricted

to quantities needed to cover immediate requirements although consumption in times of a fair rate. We quote Straits menload lots at 32 1/2c f. o. b. New York.

### PLATINUM

The demand for Platinum is good and prices are firmer. New York is quoted \$17.75 per ounce for large lots and \$18 for smaller orders.

### POTASSIUM CYANIDE

Purified, 98@99 per cent., in cases of 120 lb. at 30c. per lb. in 5, 10, 25 and 50 lb tins at an advance.

### QUICKSILVER

The wholesale price in New York has advanced \$1 and is now \$48.00 per flask. The London price has risen to £8 17s 6d per flask, with the same rate from second hands.

### THE MINOR METALS.

Quotations are given below for New York delivery:

Aluminum		
No. 1, 99 per cent ingots, per lb.		30 1/2c
No. 2, 90 " "		31 1/2c
Rolled sheets, per lb.		32c up
Aluminum-Nickel, per lb.		33 1/2c
Alum bronze		34 1/2c
Bismuth, per lb.		\$1.45 @ 1.50
Phosphorus, per lb.		48 1/2c
Magnesium		7 1/2 @ 8c
Ironstone, per lb.		70c
Ferro-tungsten, 60 per cent.		60c

Variations in price depend chiefly on the size of the order.

### ACIDS.

Acetic is in good request, muriatic is moving briskly on contract, and sulphuric is unchanged. Blue vitriol is quiet. Only 50 bbls. oxalic acid were imported this week.

The exports from the United States in August amounted to \$12,653

### BRIMSTONE

There are no exports. Spot East on mixed second \$22 @ \$22.50 per ton and shipments \$21.15; thirds, \$19. The imports of brimstone into the United States in August were 11,100 tons.

### NITRATE OF SODA

Demand is very quiet and quotations for all positions are nominally \$1.85 per 100 lbs. Odd lots can doubtless be had at \$1.62 1/2. The United States imported 18,708 tons nitrate of soda in August.

### CHEMICALS

Most of the business done in these chemicals is for immediate delivery. The little doing on spot being at advanced prices. Imports this week included 300 drums 210 casks and 2 bbls. bleaching powder. Importers expect a curtailment of shipments from England. When the Boer war is over, the mercantile vessels will be used for transporting troops to South Africa. Receipts of domestic goods at New York last week included 1055 sacks alkali and 250 drums caustic soda.

Caustic soda high test is quoted for 100 lbs. f. o. b. works at 1.77 1/2 @ 1.82 1/2; in New York, \$1.85 @ \$1.90. Bi-carbonate of soda is quoted per 100 lbs. f. o. b. works, \$1.12 1/2 @ \$1.25. Chlorate of potash crystals in New York are quoted for domestic, \$8.75 @ \$9.00; foreign, \$9.75 @ \$9.37 1/2; powdered domestic at \$9.25 @ 9.50, and foreign, 9.50 @ 9.75.

### CHLORIDE OF LIME.

English prime brands are quoted at 1.65 @ 1.75 with 1.50 @ 1.60 for other brands.



BROWN, DURRILL & CO.

CLING-SURFACE MFG. CO.,

BUFFALO, N. Y.

BOSTON, MASS., Aug. 1, 1899.

DEAR SIR:—Having tried Cling-Surface on my 12" dynamo belt (18 feet between centres), I have been able to carry full load with 22" sag on belt with no perceptible slip. It surpasses my expectations and I can recommend it to do all that is claimed for it, if directions are followed.

Yours respectfully, E. B. PRESCOTT, Engineer.

FOUR  
MONTHS  
AGO

this Belt was as tight as a fiddle string, under about 1000 lbs. initial tension and yet was slipping. There is no slip now for it runs slack. CLING-SURFACE did it.

CLING-SURFACE MANF. CO.,

167-172 VIRGINIA ST., BUFFALO N. Y.

Represented in Salt Lake City by the UTAH RUBBER & MANF. CO.

First Quality in all Lines

# Mining Machinery AND Supplies



STEAM

ENGINES  
HOISTS  
PUMPS  
BOILERS

GASOLINE

ENGINES  
HOISTS  
AIR COMPRESSORS  
PUMPING PLANTS

Our Combined Geared Gasoline Engine and Hoist, and Combined Gasoline Engine and Air Compressor Especially adapted for Mining Purposes.

Fairbanks' Standard Scales, Mining Cars, Spiral Riveted Pipe, Car Wheels, Pipe and Fittings.

Fairbanks, Morse & Co.,

Chicago, Cleveland, Cincinnati, Louisville, Indianapolis, St. Paul, Minneapolis, St. Louis, Kansas City, Omaha, Denver, San Francisco, Los Angeles, Portland, Oregon.



## FINANCIAL NOTES.

**AVERAGE PRICES OF METALS.**  
in New York per 100 lbs. from January 1st, 1899:

Month	Copper	Tin	Lead	Spelter
January	14.74	22.48	4.18	5.34
February	18.50	24.20	4.49	6.28
March	17.71	21.82	4.37	6.31
April	18.61	24.68	4.31	6.57
May	18.25	25.76	4.44	6.88
June	17.03	25.85	4.42	5.98
July	18.12	29.63	4.52	5.82
August	18.46	31.53	4.57	5.05
September	18.46	32.74	4.58	5.30
October				
November				
December				

**AVERAGE MONTHLY PRICES OF SILVER.**  
In New York per ounce Troy, from January 1st, 1899, and for the years 1898 and 1897:

Month	1899	1898	1897
January	69.80	66.77	64.79
February	69.42	66.07	64.67
March	69.64	66.00	65.06
April	69.10	64.02	61.85
May	61.24	56.94	60.42
June	60.43	58.61	60.10
July	60.26	59.06	59.61
August	60.00	59.54	59.10
September	58.89	60.68	63.24
October		60.42	57.67
November		60.60	57.01
December		59.42	58.01
Year		58.26	59.79

**MONEY IN CIRCULATION.**

Comparative statement of the circulation in the United States on Oct. 1st 1899. Comparison being made with statement on September 1st, 1899.

	October 1, 1899	September 1, 1899
Gold	\$46,561,185 D.	\$26,372,007
Silver	142,801,005 I.	5,326,932
Legal Tenders	314,924,600 I.	4,824,179
Treas'y & N.P.I. B'k Notes	329,688,256 D.	483,165
Totals	\$1,144,014,746 D.	\$16,624,661

Gold and Silver certificates and currency are not included in this table. By adding the amounts given in this table

with those in the following will give the total amount coined or issued. The figures herewith are furnished by the Bureau of Statistics Treasury Department.

**MONEY IN TREASURY.**

Comparative statement of changes of money in United States Treasury on Oct. 1st 1899, comparison being made with statement, on Sept. 1st, 1899.

	October 1, 1899	September 1, 1899
Gold	\$122,271,599 I.	\$31,283,325
Silver	415,844,704 D.	4,650,483
Legal Tenders	11,776,416 I.	4,824,179
Treas'y & N.P.I. B'k Notes	4,800,547 I.	857,401
Totals	\$673,693,656 I.	\$37,615,088

The Gold and Silver bullion on hand in the Treasury is not included in this statement.

**GOLD AND SILVER EXPORTS AND IMPORTS.**

At all United States ports, for the month of September, 1899, and 9 months ending September, 1898, and 1899:

	SEPTEMBER, 1899	SEPTEMBER, 1898
Gold—		
Exports	\$3,102,810	\$ 618,995
Imports	16,808,341	2,593,894
Excess	\$13,705,531	\$ 1,974,899
Silver—		
Exports	\$5,152,103	\$3,622,041
Imports	3,000,696	2,376,846
Excess	\$2,151,407	\$ 1,245,195

**NINE MONTHS ENDING AUGUST.**

	1898	1899
Gold—		
Exports	\$12,791,923	\$32,877,838
Imports	127,343,816	34,268,421
Excess	\$114,551,893	\$ 1,396,583
Silver—		
Exports	\$39,431,500	\$38,738,431
Imports	21,059,324	22,974,095
Excess	\$18,372,176	\$ 15,764,336

This statement includes the exports and imports at all United States ports, the figures being furnished by the Bureau of Statistics of the Treasury Department.

**The Cleveland Mining and Stock Exchange Co.**

New England Building, Cleveland, Ohio.

A Reliable Information Bureau for Miners and Investors to obtain **FACTS** Regarding Capital and Mines. Stocks and Mines listed. Send for prospectus.

**Morgan-Watson Mining and Construction Co.**

800-810 New England Building, Cleveland, Ohio

**MINES AND STOCKS**  
We Buy, Sell, Lease and Bond Mines of all kinds  
We Buy, Sell, and Negotiate sales of mining and other stocks.  
We Furnish Machinery to work good mines under special arrangement.  
We Furnish Capital to develop mines.

**JAMES IRVING & CO.****REFINERS****ASSAYERS**

Largest and most complete establishment in Southern California Cyanide and Mill Test.



128 N. Main Street (Old Location.) Los Angeles, Cal.

**L & C**

Combination Melting and Muffle

**Assayers' Furnaces**

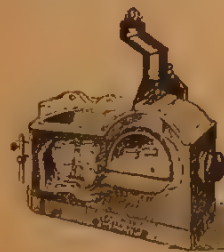
(For Gasoline)

Are Economical, Convenient and Efficient.  
DESCRIPTIVE CATALOGUE ON APPLICATION.

**F. W. BRAUN & Co.,**

Assayers Supplies of Every Description.

501-505 N. MAIN STREET  
LOS ANGELES, CAL.



This illustration shows L & C Combination Furnace, melting and cupelling simultaneously with one burner.

**RIVETED SHEET STEEL WATER PIPE**  
For Placers, Water Powers, Irrigation, Etc.  
**THE WEIGLE PIPE WORKS**  
2949-51 Larimer St. DENVER, COLO.

**WANTS**

Advertisements of this class containing not more than five lines will be inserted for not exceeding three months in any year, free of charge, to all paid-up annual subscribers.  
Other than above \$1.00 per month.  
Advertisements not accepted for less than one month.

**COPPER MINE.** State full particulars in regard to development work location, distance from water, price of fuel, character of ore and returns from shipments. Must have at least 1500 feet of development work. Send all information possible. Address,

**JAMES HOWARD,**  
Care The Mining and Metallurgical Journal,  
32 Broadway, New York, N. Y.

**GOLD mine anywhere in United States,** must have at least 1000 feet of development; where coal is not over \$6.00 per ton or wood \$4.00 per cord delivered; plenty of water; no objection to low grade ore if profit can be made by having large plant to amalgamate and concentrate; want 6 months working bond; no property considered unless owners are prepared to deposit certified check for expenses of engineer if property is not as represented. Address with price and full particulars

**J. E. M., Mining and Metallurgical Journal,**  
32 Broadway, New York, N. Y.

**EXPERIENCED** man desires position, who can install, run and keep in repair, Steam, Electrical and Mining machinery, has knowledge of assaying and office work. References Address: **W. H. K., McCLOUD, CAL.**

**PRACTICAL** young assayer desires position as assistant assayer or helper around mill. Best of reference if desired. Address, **ALBERT GUY,**  
**Y. M. C. A., 209 S. Broadway, Los Angeles, Cal.**

**Gold, Silver, Copper, Zinc and Lead Mines.**  
Partner wanted who would invest \$20,000 in developing a large Mining property located in the Territory of Tepic, Mexico, on the Pacific Coast. Gold mines are averages from 2 to 30 oz. per ton of 2000 lb., Silver from 1 to 38 kilo, Lead from 15 to 30 per cent., Zinc from 20 to 25 per cent., Copper from 5 to 25 per cent. Reports, Maps and Samples sent on application. Waterfalls 500 ft. and sufficient timber close to the mines. Call or address,  
**ELIAS GALINDO,**  
94 Turbide St., Tepic, Mexico.

**NOTICE TO STEAM USERS.**

The National Association of Stationary Engineers is prepared to furnish Engineers of guaranteed ability for any plant in the city or elsewhere. Give us a call.  
Address: **J. T. CHAMBERS, Sec'y,**  
Pine Room City Hall.  
Tel. Main 557. Los Angeles, Cal.

**WANTED POSITION** by experienced Amalgamator and general Mill man. Have worked in the largest mill on Pacific Coast and Mexico, speaks Spanish, highest references. Apply Con C. W. Geoghagan Assay Office, 956 3rd St., San Diego Cal.

**FOR SALE**

**WILL GIVE** one-half interest in a group of five gold claims in the desert for parties who will put up mill and Cyanide plant. Address, **"J. G. B."**  
Journal Office, Los Angeles, Cal.

**A LARGE** Gold deposit, will average \$15.00 free gold suitable for Cyanide Process. Twelve miles from Railroad, in Arizona. Terms reasonable.

**H. P. DURRELL,**  
El Paso, Texas.

**REMAIN** Two Stamp Steam Mill at Tucson, Arizona. 12-H. P. Boiler Pump and every thing complete, set up ready for work. In excellent condition, used less than six months. Address **DARDING MINING MACHINERY CO.**  
Kansas City, Mo.

**CONTRACTOR'S PLANT FOR SALE.**

85,000 feet Wire Rope, all sizes, for Hoisting and Guy use; 200 Army Tents; plain Sillings; Manila Rope; Iron Blocks; Iron Shackles. These goods have only been used a few days. Can be bought cheap.  
**EDWARD J. KANE,**  
250 Front St., New York City.

**CHEMIST,** 5 years training and knowledge of Mineralogy, desires position with prospecting party or as assistant in laboratory. Highest endorsements. Address,  
**J. W. PAUL,**  
Ashville, N. C.

**PAKE CAPE NOTE**

**TRANSPORTATION** or Mining Companies and Information Bureaus are always exposed in "INDUSTRY & MINING." It is the official paper of the Alaska Miners' Association—better take it for three months and keep posted on the Mining Industry of the Northwest. Only 50 cents. **W. J. HOMER, Publisher,**  
18 Colman Building, Seattle, Wash.

**FOR SALE AT A BARGAIN.**

**A 60-TON** copper smelting Plant, consisting of two 30-ton furnaces, one of which has new seamless liner. Plant is complete in every detail. Also an 80-ton Silver-Lead Furnace, entirely new, never having been set up. All of the above located immediately adjacent to railroad. Enquire of **CARDINER, WORTHEN & Goss,** dealers in Mining and Mill Supplies, Tucson, A. T.

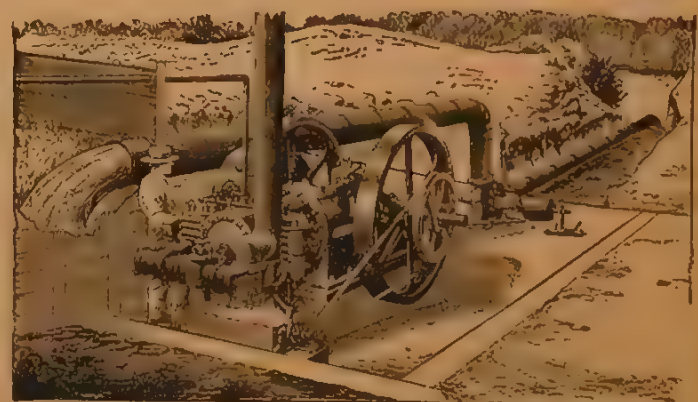
**STEEL CASTINGS**

From 1 to 40,000 pounds weight

Of Open Hearth or Chester Steel. True to Pattern, Sound, Solid. Gearing of all kinds and Crank Shafts, Shafts, Dies, Crusher Plates, Bosses, Tappets and Roll Shafts. Steel Castings of every description.

**Chester Steel Castings Co.,**

Works Chester, Pa., Office, Library St Philadelphia, Pa.

**LARGEST GASOLINE PUMPING PLANT IN THE WORLD**

The illustration shows the gigantic pumping plant recently built by the Hercules Gas Engine Works at the Packer Ranch, Colusa Co. 80 h. p. Hercules Engine, pumping 7200 gallons a minute, 27 feet high. Burns Gasoline or Distillate oil. Cheapest power known. Gas, Gasoline and Oil Engines, 2 to 200 h. p. Send for Catalogue, **HERCULES GAS ENGINE WORKS, 910 Bay St., San Francisco.**



## MINING STOCK QUOTATIONS

## BOSTON

Adventure	7 00	Mass	9 50
Aetna	—	Metrol	10 00
Allouez	3 50	Michawk	15 00
Anacanda	37 51	Napa	5 00
Arctian	26 00	Old Colony Con	25 01
Arnold	5 75	Old Dominion	62 50
Athletic	25 00	Owens	36 50
Battle	17 50	Parratt	—
Bingham	10 00	Pioneer	140 00
Bonanza	—	Quincy	5 00
Boston & Mont	265 00	Rhode Island	5 00
Breece	—	Santa Fe	7 00
Butte & Boston	45 00	Santa Isabel	170 00
Calumet & Hecla	720 00	Tamarrack	3 75
Catalpa	—	Tremont	6 38
Centennial	18 50	Tri Mountain	—
Cochiti	11 50	Victor	3 00
Copper Range	20 10	Victoria	—
Crescent	—	United States	26 50
Domillon Pref.	42 00	Utah Con	1 13
Franklin	13 35	Washington Ming	—
Gold Dredging	—	White Knob	—
Humboldt	—	Wiluna	5 50
Ile Royale	22 75	Wolverine	37 00
McIntosh	1 50	Wyandotte	2 00

## ROSSLAND, BRITISH COLUMBIA.

Brand'n & G'd Crk	28	Kootenay Gold F.	—
Brit-Amor. Cor	—	Lewick	—
Brit-Col Dev. Co	—	Lily May	10
Canad G'd Fields	07 1/2	London B. C. G F.	7 00
Cariboo	1 10 1/2	Monte Cristo	05 1/2
Commander	—	New G'd Fields	59
Deer Park	04 1/2	Novelty	—
Dundee	—	Queen Beas Prop.	50
Evening Star	09	Rambler-Caribon	68
Fern	28	Red Mount, View	—
Gold Fields of B.C.	—	Reco	—
Hattie Brown	—	Silver Bell	—
Hall Mines	—	Silver Queen	—
Homestake	—	St. Elmo	05 1/2
Iron Horse	06	Slocan Star	1 10
Iron Mask	75	Vic. Tr M Dev. Co.	—
Josie	—	Waverly Mines	—
Jumbo	25	War Eagle Con	2 75
Kenneth	—	White Bear	—
Keystone	—	—	—

## SAN FRANCISCO.

Alta	—	Mexican	30
Andes	10	Occidental	20
Belcher	33	Ophir	87
Best & Belcher	38	Overman	18
Bullion	04	Outro	—
Caledonia	70	Plymouth	—
Challenge	30	Potosi	58
Chollar	31	Quicksilver	—
Confidence	30	Quicksilver pref'd	—
Con. Cal & Va	1 55	Savage	25
Crown Point	15	Seg Belcher	03
Deadwood	—	Sierra Nevada	02

Gould & Curry	35	Silver Hill	—
Hale & Norcross	37	Standard	3 05
Homestake	—	Union Con	—
Iron Silver	—	Utah	12
Justice	—	Yellow Jacket	28

## COLORADO SPRINGS STOCKS

Aetna	28 1/2	Hayden	02
Alamo	09 1/2	Ingham Con	10
Almont	—	Isabella	9 1/2
American Con	—	Jack Pot	85
Anacanda	44 1/2	Kimberly	13
Aolia	03 1/2	Lexington	21 1/2
Arcadia Cons	03 1/2	Magnet Rock	05 1/2
Argentum Junata	25	Matos	32 1/2
Bankers	06 1/2	Montreal	15 1/2
Banner	05 1/2	Mountain Beauty	27
Bob Lee	06 1/2	Mollie Gibson	27
Creede & C. Co.	13	Moon Anchor	74 1/2
Cripple Crk Con	15 1/2	Mount Rosa	38 1/2
Dante	19 1/2	New Haven	08 1/2
Des Moines	05 1/2	Oriole	08 1/2
Elkhon Con	12	Orphan	15 1/2
El Paso	41 1/2	Pharmacist	08 1/2
Emma Almee	02 1/2	Pilgrim	07
Fanny B.	04 1/2	Portland	2 45
Favorite	05	Pr. Albert	04 1/2
Findley	17	Rattler	07 1/2
Golden Fleece	28	Specimen	13 1/2
Gold & Globe	08	Therese	08 1/2
Gold Kings	04	Union	32 1/2
Gould	30 1/2	Vindicator	1 42
Granite Hill	08 1/2	Work	32 1/2

## SALT LAKE CITY

Anchor	50	Joe Bowers Ex.	05
Ajax	08	La Reine	60
Alliance	—	Lower Mammoth	26
Alice	40	Little Pittsburgh	05 1/2
Bullion Beck	3 55	Mammoth	2 48 1/2
Buckeye	—	Mecur	0 33
Cent. Eureka	08 00	May Day	61
Chloride Point	25	Northern Light	14 1/2
Congor	25	North Swans	—
Daily	1 41	Omaha	15
Daily West	12 75	Ontario	8 20
Dalton & Lark	03	Petro	40
Dalton	01	Rich. Anacanda	29
Dexter	2 45	Sunshine	30
Daisy	19 1/2	Swans	3 92 1/2
Eagle	03 1/2	So Swans	1 35
Eagle & Blue Bell	1 45	Sunbeam	57 1/2
Emerald	12	Sacramento	45
Four Aces	—	Silver King	45 00
Geyser-Marion	34	Star Consolidated	43
Galena	30	Showers Con	38
Grand Central	5 50	Tetro	05
Golden Eagle	04 1/2	Utah	50
Horn Silver	1 17	Valeo	85
Homestake	04 1/2	West Mt'n Pl'er	11
Ingot	09 1/2	Yankee Con	15 1/2
Joe Bowers	—	—	—

## NEW YORK.

Adams Con	12	Isabella	1 40
Alamo	11 1/2	Iron Silver	50
Alice	45	Jefferson	—
Alliance	—	Jennie Blanche	—
Anacanda Copper	30	June	—
Anacanda Gold	41	King & Pemb	35
Anchors L.	72	Leahville Cons	08
Argentum Junata	18	Little Chief	18
Belcher	12	Mexican	35
Best & Belcher	23	Mollie Gibson	24
Burt Gold	—	Mt. Rosa	45
Breece	—	Occidental	10
Brasswick	1 75	Ophir	7 25
Chollar	20	Ophir	75
Chrysanite	—	Pharmacist	08
Comstock Tunnel	04	Phoenix	08
Comstock Stocks	04	Plymouth	08
Comstock Script	05	Portland	2 78
Cr. Cal & Va	1 45	Potosi	2 00
Cr. & Or. Creek	12	Quicksilver	7 50
Crescent	—	Quicksilver pf'd	—
Crown Point	14	Rocky Mountain	—
Cripple Creek Con	18	San Juan Star	—
Deadwood Terra	—	Savage	05
Elkhon	1 85	Sierra Nevada	47
Enterprise	—	Small Hope	80
Good Samaritan	—	Specimen	08
Gold Coin C. Crk	—	Standard Con	2 40
Gold Coin Gilpin	—	Standard	—
Golden Fleece	21 1/2	Union Con	20
Gould & Curry	20	Union	32 1/2
Gregory Gold	—	Utah Con	03
Hale & Norcross	30	Union Gold	—
High Five	—	Vindicator	—
Homestake	65 00	Work	28 1/2
Horn Silver	1 00	Yellow Jacket	20

## SPOKANE, WASHINGTON.

Ben Hur	15	Mountain Lion	1 08
Black Tail	14	Morillon	—
Butte and Boston	05 1/2	Number Six	—
Cariboo	—	Pearl	11
Deer Trail No. 2	22	Princess Maude	14 1/2
Golden Harvest	04	Quill	12
Insurgent	04	Rebate	—
Iron Monitor	—	Republic	49
Joe Blaine	—	San Poll	21
Liberty	—	Tom Thumb	17
L. Pine Surp. Con	—	Winipeg	—
Morning Glory	11 1/2	—	—

## DENVER STOCK REPORT.

Aetna	—	Keystone	11 1/2
Anchona Leland	70	Lillie	—
Anacanda	44 50	Matos	32 1/2
Arcadia	—	Mollie Gibson	27
Argentum Junata	25	Moon Anchor	73 1/2
Banner	04 1/2	Mt. Rosa	39 1/2

Bob Lee	—	Old Gold	—
Elkhon	1 17	Peoples	—
El Paso	—	Pilgrim	07 1/2
Enterprise	—	Pine Creek	11 1/2
Fanny B.	—	Portland	2 45
Garfield	—	Prince Albert	04 1/2
Geo. Washington	—	Republic	08
Golden Eagle	—	Sacramento	—
Gold Coin	2 10	Smuggler	—
Gilpin & C. Co.	—	Specimen	13 1/2
Gilpin Four	—	Tamarrack	—
Golden Fleece	26	Union	32 1/2
Isabella	31 1/2	Virginia M	08 1/2
Iron Glad	—	Wheels Cons	—
Jack Pot	85	Work	32 1/2

## MEXICO

Name of Company	State	Price
Amistad y Concordia	Hidalgo	29
Angustias	Guajuato	280
Arcevalo y Anexas	Hidalgo	290
Asuriana y Anexas	Zacatecas	180
Barrados y Cabras	Durango	60
Barlome de Medina	Hidalgo	48
Cabexas y An	Zacatecas	16
Candelaria de Pinos	Durango	140
Capatzen	Hidalgo	30
Carmen	Hidalgo	300
Cinco Senores y An	Guajuato	450
Concepcion y Anexas	S. Luis Potosi	200
Coronas	Mexico	75
El Oro	Guajuato	30
El Oro, prof.	Guajuato	30
Epitaphia y Ab.	Mexico	1,600
Florida	Chihuahua	235
Guadalupe	Guajuato	50
Luz de Florida Aviado	Michoacan	30
Luz de Florida Aviado	Michoacan	30
Luz de Maravillas	Hidalgo	120
Dabulos	Zacatecas	20
Palma de Somb.	Durango	2,000
Pinos	Hidalgo	1,020
Rafael y Anexas	Durango	600
Real del Monte	Durango	20
Restauradora	Durango	15
Rosario y Anexas	Hidalgo	195
San Francisco	Hidalgo	410
San Rafael Aviado	Hidalgo	20
San Rafael del Oro	S. Luis Potosi	440
Sta. Maria de la Paz	Hidalgo	330
Soledad	Hidalgo	280
Sopresa	Guajuato	50
Trinidad Aviado	Guajuato	40
Trinidad Aviado	Puebla	20
Flauzingo	Hidalgo	350
Union Hieda	Hidalgo	80
Zona Min de Paz	Guajuato	80

NOTE: The above Mexican stocks are figured on the basis of Mexican silver

CLARENCE HERSEY,  
Assayer and Chemist.

(Established 1879)

LEADVILLE, COLORADO

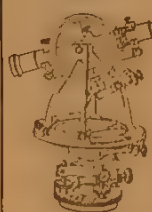
Samples by Mail or Express Receive Prompt Attention

## SPECIMEN ASSAY PRICES:

Gold silver and lead, \$5.00; any two of the above, 75c; any one of above, 50c; copper analysis, \$1; platinum, nickel or tin, \$5.00.  
Write for full price list and mailing envelope

## ADOLF FRESE

Maker and Repairer



of Transits, Levels and all other instruments used in mining. Fine assorted stock of Keuffel and Esser goods. Also Microscopes, Barometers, Field Glasses, Thermometers, Hydrometers, etc.

126 S. SPRING STREET

Los Angeles, California

## BULLOCK DIAMOND DRILLS

If you are interested in prospecting, send for our new Catalogue No. 33.

## BULLOCK MINING MACHINERY

Hoists and Haulage Plants, Mine Ventilators, Cars, Skips, Cages.

Write for What You Want.

PARKE &amp; LACY CO., AGENT

306 BYRNE BLDG., LOS ANGELES, CAL.

M. C. BULLOCK MFG. CO.,

1169 W. LAKE ST., CHICAGO, U.S.A.

## FROM CRIPPLE CREEK

AIR COMPRESSORS  
ROCK DRILLS,  
Stone Channelers,  
The Pohle Air Lift Pump,  
Coal Cutters,

THE INGERSOLL-SERGEANT DRILL COMPANY, HAVEMEYER BUILD'G  
PARKE & LACY CO., AGENTS, SAN FRANCISCO, CAL.

New Catalogue No. 32

New Catalogue No. 41

Pamphlet No. 100

Catalogue No. 72

Special.

JAMES F. BURNS, Pres't. JOHN HARNAN, Gen. Man.

FRANK O. BECK, Sec'y and Treas.

THE PORTLAND GOLD MINING CO.,

(Stock Transfer Office, Colorado Springs.)

Mines at Victor, Colorado.

COLORADO SPRINGS, COLO., May 19, 1898

The Ingersoll-Sergeant Drill Co.,

Gentlemen:—We bought two years ago one of the largest

size of the straight line type of Ingersoll-Sergeant Piston

Inlet Compressor.

This was found to be too small for our needs about a year

ago and we purchased of you a Duplex Corliss machine

16" x 15 1/2" x 42".

This was set in place in our shaft house in the Cripple Creek

District, 10,000 feet above the level of the sea, and has been

running continuously ever since, and at times over to 3 1/2"

Kilopascals. The steam cylinders were connected to an in-

dependent Jet Condenser, for which we are using the mine

water, and the resultant economy of operation is very

noticeable.

The operation of this Compressor is as near perfect as

that of any machine we have ever seen, and this type is well

worth the extra cost on account of the great permanent

economy in operation.

Our mine is equipped exclusively with your drills and we

have only the highest words of praise to give them.

Yours very truly, The Portland Gold Mining Co.,

Jas. A. Burns, President.



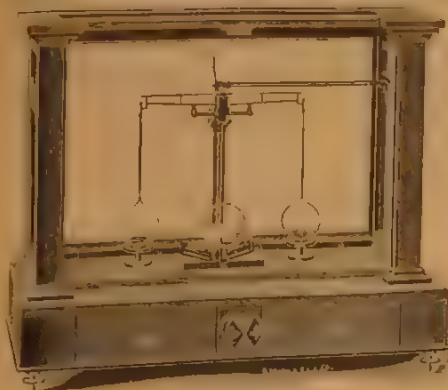
## INCORPORATED MINES PAYING DIVIDENDS.

	NAMES OF MINES	LOCATION	No. of Shares	Capital Stock	Par Value	Amount of last Dividend	Date of Last Dividend	Total Amount Paid in Dividends	Kind of Minerals Produced
1	Astoria Cons.	California	100,000	\$ 500,000	\$ 5	\$ 10	Oct 1899	165,000	G
2	Alamo	Utah	125,000	125,000	1	02	April 1899	2,300	G, C, I
3	Alaska, Treadwell	Alaska	200,000	5,000,000	25	37 1/2	Oct 1899	1,000,000	G
4	Alaska, Mexican	Alaska	200,000	1,500,000	5	10	Oct 1899	120,000	G
5	Anacostia Copper	Montana	1,200,000	30,000,000	25	2 00	Nov 1899	12,150,000	C
6	Anchorage Leland	Colorado	600,000	600,000	1	03	Oct 1899	31,000	G
7	American Gold	Colorado	300,000	3,000,000	10	09	June 1899	493,000	G, S, I
8	American Coal	Maryland	60,000	1,500,000	25	1 25	Sept 1899	27,500	Coal
9	American Zinc, Lead and Smelting	Missouri	200,000	500,000	25	10	Oct 1899	10,000	Z, L
10	April Fool	Nevada	600,000	500,000	1	01	Oct 1899	18,000	
11	Aurora	Michigan	100,000	2,500,000	25	50	June 1899	800,000	I
12	Argonaut	California	200,000	2,000,000	10	10	Nov 1899	100,000	
13	Bald Butte	Montana	250,000	250,000	1	08	Dec 1899	792,141	G, C, S
14	Bonanza Development	New Mexico	300,000	3,000,000	10	3 50	June 1899	1,500,000	
15	Boston & California	California	600,000	600,000	1	06	June 1899	72,000	
16	Boston and Colorado Smelting	Colorado	15,000	750,000	50	75	Oct 1899	375,000	
17	Boston & Montana Con.	Montana	150,000	3,750,000	25	1 00	Nov 1899	11,500,000	G, C, S
18	Breece	Colorado	200,000	5,000,000	25	05	Dec 1899	70,000	I
19	Bullion Beck and Champion	Utah	100,000	1,000,000	10	10	Dec 1899	2,138,000	G, S
20	Bunker Hill and Sullivan	Idaho	300,000	3,000,000	10	07	Dec 1899	768,000	S, L
21	Cariboo, Mc Kinney	British Col.	80,000	800,000	1	01 1/2	June 1899	111,000	G
22	Calumet & Hecla	Michigan	10,000	2,500,000	25	20 00	Sept 1899	64,850,000	C
23	Centennial Eureka	Utah	30,000	1,500,000	50	50	Aug 1899	2,150,000	S, I
24	Central Lead	Missouri	10,000	1,000,000	100	50	Dec 1899	112,000	L
25	Charleston	S. Carolina	10,000	1,000,000	100	2 00	June 1899	200,000	
26	Colorado Smelting	Montana	100,000	1,000,000	10	1 00	Jan 1899	1,045,000	G, S, C
27	Commonwealth pref.	Missouri	100,000	500,000	5	01	Dec 1899	20,000	Z
28	Delta Lea & Zinc	Missouri	100,000	100,000	1	00 1/2	Dec 1899	4,500	
29	De Lamar	Idaho	400,000	2,000,000	5	12	May 1899	2,316,000	G, S
30	Deer Trail No 2	Washington	1,000,000	1,000,000	1	00 1/2	Nov 1899	45,000	
31	Dee Run	Missouri	5,000	500,000	100	50	Dec 1899	90,000	L
32	Empire State Idaho	Idaho	75,000	750,000	10	30	Dec 1899	123,000	
33	Fanny Rawlings	Colorado	1,000,000	1,000,000	1	01	Aug 1899	20,000	G, S
34	Farris-Haggerty	Wyoming	1,000,000	1,000,000	1	00 1/2	Mar 1899	5,000	C, G, S
35	Garfield Consolidated	Colorado	1,200,000	1,200,000	1	01	May 1899	34,000	G
36	Golden Star	Ontario, Canada	100,000	100,000	1	01	July 1899	41,000	
37	Gold Coin of Victor	Colorado	1,000,000	1,000,000	1	01	Nov 1899	260,000	G
38	Gold King	Colorado	1,000,000	1,000,000	1	03	Oct 1899	90,000	G
39	Golden Cycle	Colorado	200,000	1,000,000	5	05	Dec 1899	268,500	
40	Grafton	Colorado	1,000,000	1,000,000	1	01	Nov 1899	10,000	G
41	Grand Central	Utah	250,000	250,000	1	24	Sept 1899	668,250	G, S, C, L
42	Gwin	California	20,000	1,000,000	50	25	Dec 1899	101,500	G
43	Grass Valley Exploration	California	50,000	100,000	2	25	Oct 1899	30,000	
44	Helena and Frisco	Idaho	500,000	2,500,000	5	25	Nov 1899	920,000	S, L
45	Highland	S. Dakota	100,000	10,000,000	100	20	July 1899	3,921,718	G
46	Holy Terror	S. Dakota	300,000	300,000	1	01	Nov 1899	162,000	G
47	Homestake	S. Dakota	125,000	12,500,000	100	50	Nov 1899	8,688,750	
48	Horn Silver	Utah	400,000	10,000,000	25	05	July 1899	7,270,000	S, L
49	Idaho	British Columbia	500,000	500,000	1	05 1/2	Jan 1899	292,000	
50	Isabella	Colorado	2,250,000	2,250,000	1	01	Sept 1899	472,500	G
51	Jack Pot	Colorado	1,000,000	1,000,000	1	04	Sept 1899	75,000	G
52	Jamison	California	300,000	3,000,000	10	10	April 1899	50,700	
53	Klondike Bonanza, Ltd.	Klondike	52,750	283,750	5	24	Aug 1899	12,680	
54	Lake Superior Iron	Michigan	81,000	2,100,000	5	25	Feb 1899	736,000	I
55	Lillie	Colorado	1,000,000	1,000,000	1	05	Nov 1899	301,610	G
56	Modoc	Colorado	500,000	500,000	1	01	Nov 1899	170,000	G
57	Montana Ltd.	Montana	600,000	3,300,000	5	12	Apr 1899	2,097,557	G, S
58	Montana Ore Purchasing	Montana	40,000	1,000,000	25	1 00	Oct 1899	1,360,000	
59	Morning Star	California	2,400	240,000	100	3 00	Oct 1899	751,800	G
60	Mercur	Utah	200,000	5,000,000	25	25	Oct 1899	1,341,000	G
61	Mammoth	Utah	400,000	10,000,000	25	10	Nov 1899	1,610,000	G, S, C, L
62	Mead	California	2,000,000	2,000,000	1	20	June 1899	120,000	G
63	Moulton	Montana	400,000	2,000,000	5	05	Oct 1899	600,000	
64	Mt. Shasta	California	20,000	100,000	5	30	May 1899	6,000	
65	New York & Hon. Rosario	Central A.	150,000	1,500,000	10	10	Nov 1899	1,130,000	S, G
66	New York Zinc	Missouri	28,000	700,000	25	25	Dec 1899	21,000	
67	Napa Cons.	California	100,000	700,000	7	30	Oct 1899	1,040,000	Q
68	New Idria Quicksilver	California	100,000	500,000	5	30	Oct 1899	170,000	Q
69	North Star, Mines of N. J.	California	200,000	2,000,000	10	20	Nov 1899	50,000	Q
70	Original Empire	California	50,000	5,000,000	100	1 00	May 1899	500,000	G
71	Oscoda	Michigan	50,000	1,250,000	25	3 00	Dec 1899	3,080,500	C
72	Parrot	Montana	230,000	2,300,000	10	1 50	Oct 1899	3,035,898	C
73	Pennsylvania Consolidated	California	51,500	5,150,000	10	20	Dec 1899	138,175	
74	Pioneer	California	100,000	1,000,000	10	12 1/2	Mar 1899	62,500	G
75	Portland	Colorado	3,000,000	3,000,000	1	02	Nov 1899	2,437,080	G, S
76	Quicksilver Pref	California	43,000	4,300,000	100	50	May 1899	1,845,411	Q
77	Quicksilver Consolidated	California	57,000	5,700,000	100	40	July 1899	643,867	Q
78	Quincy	Michigan	100,000	2,500,000	25	6 00	August 1899	11,070,000	C
79	*Republic Consolidated	Washington	3,000,000	3,000,000	1	01	Sept 1899	323,000	G
80	Rambler-Cariboo	British Col.	1,000,000	1,000,000	1	01	Dec 1899	60,000	S, L
81	Royal Consolidated	British Col.	2,500,000	2,500,000	1	01	June 1899	1,050,000	G
82	Sacramento	Utah	1,000,000	5,000,000	5	00 1/2	Oct 1899	138,000	G
83	Small Hopes Consolidated	Colorado	250,000	5,000,000	20	10	Feb 1899	3,325,000	S
84	South Swansea	Utah	150,000	150,000	1	05	Dec 1899	165,000	S, L
85	Standard	Idaho	500,000	500,000	1	08	Apr 1899	1,745,000	G, S
86	Standard Consolidated	California	200,000	20,000,000	100	10	Aug 1899	3,879,226	G, S
87	St. Joseph	Missouri	30,000	3,000,000	10	50	June 1899	2,859,000	L
88	Silver King	Utah	150,000	3,000,000	20	34	Dec 1899	2,600,000	S, L, G
89	Smuggler	Colorado	1,000,000	1,000,000	1	01	Dec 1899	1,220,000	S, I, Z
90	Swansea	Utah	100,000	500,000	5	05	Nov 1899	251,000	S, L
91	Tamarack	Michigan	60,000	1,500,000	15	6 00	Dec 1899	6,270,000	C
92	Tomboy	Colorado	200,000	2,000,000	10	24	Dec 1899	812,000	G
93	Vindicator Consolidated	Colorado	1,500,000	1,500,000	1	05	Oct 1899	304,500	G
94	War Eagle Consolidated	British Col.	2,000,000	1,000,000	1	01 1/2	Dec 1899	492,750	
95	Wolverine	Michigan	60,000	2,500,000	25	1 50	Oct 1899	270,000	C
96	Yellow Aster	California	100,000	1,000,000	10	10	Dec 1899	233,789	G

S. Silver; G. Gold; L. Lead; O. Copper; Q. Quicksilver; I. Iron; Z. Zinc.

N. B.—Companies not listed paid nothing in the last twelve months. \*Paid since consolidation, \$203,000; Republic paid \$120,000 under old management.



**No. 045 Button Balances**

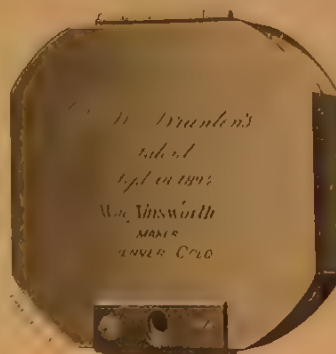
Sensitivity 1-80 Milligramme

This balance was designed with a view to furnishing an accurate and reliable balance for silver button and moderately accurate gold button work.

It has all the latest improvements and is an up-to-date balance in every particular.

If you anticipate buying and want a good balance at a moderate price, write us for particulars; you will be surprised to find how cheaply this balance can be purchased.

For complete description of this and other balances write for catalogue A.

**Brunston's Pat. Pocket Mine Transit.**

Actual Size

The engraving herewith illustrates Brunston's Pat. Pocket Mine Transit as it appears when folded ready for the pocket.

The working parts are enclosed by an aluminum case, the outside dimensions of which are but  $2\frac{3}{4} \times 2\frac{3}{4} \times 1$  inches and the total weight but 8 ounces.

There are over five hundred of the above instruments in daily use at the present time, and those using them unite in pronouncing them the most convenient, accurate and reliable pocket instruments on the market. Send for catalogue B.

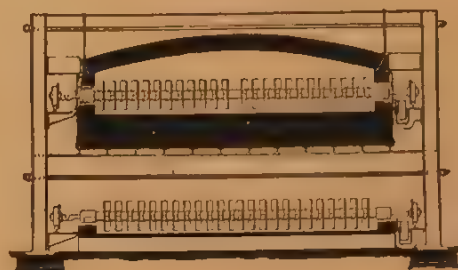
**WM. AINSWORTH & SONS, Denver, Colorado, U.S.A.**

# ROASTING— FURNACES

OF THE

WETHEY MULTIPLE DECK AND  
HOLTHOFF-WETHEY STRAIGHT-LINE } TYPES

**WE CLAIM—**That These Furnaces are built from Original Designs fully covered by Strong Patents which we control and will protect. The design embodies **NUMEROUS NEW FEATURES** in the construction of Ore Roasting Furnaces and Does Not Imitate or rely on any of the old and very faulty models.

BUILT  
ONLY  
BY

FURTHER INFORMATION ON APPLICATION.

**THE EDWARD P. ALLIS CO.**

MILWAUKEE, WISCONSIN

**SULLIVAN ROCK DRILLS**

**Rapid, Strong, Convenient, For Mining, Shaft Sinking,  
and Tunneling**

**SULLIVAN Diamond Prospecting Drills**

Operated by Hand, Horse Power, Steam, Compressed Air  
and Electricity.

**Contractors for Prospecting with the Diamond Drill.**

**SULLIVAN MACHINERY CO.,**

Cable Address, Diamond, Chicago,  
Codes:  
A. B. C., 4th Edition,  
Postal Directory,  
Western Union,  
Liebers.

**54 TO 60 NORTH CLINTON STREET  
CHICAGO, ILL., U. S. A.**

AGENCIES—332 17th St., Denver, Colo.; Empire  
Building, 71 Broadway, New York; Henshaw-  
Bulkley & Co., San Francisco Cal.





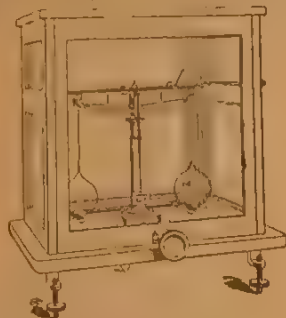


### The Detroit Lubricators in Good Company.

Fully 9-10ths of the prominent American engine builders use The Detroit Lubricators on their engines. They will not equip an expensive engine with an inferior or mediocre lubricator as their experience has taught that the risk is too great. This preference by those best qualified to judge of their merits is the best recommendation that could be given our goods. Our catalogue showing our different lubricators, glass and brass oilers, oil pumps, etc., will be sent on application.

DETROIT LUBRICATOR CO., Detroit, Mich.

### QUEEN NO. 4 ASSAY BALANCE



Aluminum Beam, Agate Knives and Planes Sensibility 1-100 mg. The Best Low-Price Assay Balance on the Market. Send for Circular.

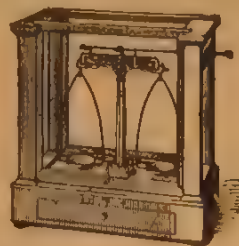
QUEEN & CO.,  
Optical and Scientific Instrument Works  
1010 Chestnut Street,  
N. Y. Office, 59 Fifth Ave. Philadelphia

ESTABLISHED IN 1840

### HENRY TROEMNER,

170 Market St.

Philadelphia, Pa.



### Assay Balances and Weights

In use in all the U. S. Assay Offices in America

PRICE LIST ON APPLICATION

# WHY

Spend your money to buy new machinery to put on Unproved Mines which may not be a success when you can buy Pumps, Hoists, Shafting, Pulleys, Air-Compressors, Engines, Boilers and in fact any Machinery you need for a Mine or Mill, as good as new, at the

Denver Variety Machine Shops, THOS. CROW, Prop.

Write for Prices and Particulars.

1712 Blake St., DENVER, COLORADO

## Spadone's Concentrator Belts

Patented



This illustration shows the edge flanging outwardly as it passes over the pulley. This relieves the strain from the top and bottom of the edge by directing the strain automatically to the inside face surface of the edges. Heretofore all belts have been so constructed that when they pass over the pulleys or rolls, a direct strain comes upon the top or at the base of the edges, causing the edges to break away from the body of the belts in a very short time. We avoid this Mechanical Defect by our Spadone's Curved Edge. Belts made to fit any machine—4, 5 and 6 feet wide. Prices and samples on application.

Send us your order for Water, Air Drill, Steam, Suction and Fire HOSE, RUBBER BELTING, RUBBER PACKING and LEATHER BELTING.

Amalgam Plate Cleaners. Our Amalgam Plate Cleaners are made of Pure Rubber in moulds, thus insuring a plate cleaner which will not scratch the plates and a perfect edge which will clean the Amalgam plates evenly. They are made 6 inches long, 8 inches wide and  $\frac{1}{2}$  in. thick, making a convenient size to handle. Price by mail to any address, each 75c. Correspondence solicited. The Gutta Percha Rubber & Mfg. Co., 30 and 32 Fremont St., San Francisco, Cal.

## Electric Blasting Apparatus.

Adapted for Firing all Kinds of Explosives used in Blasting



SEND FOR CATALOGUE  
railroad quarrying, and mining works.

Victor Blasting Machine. Fires 5 to 8 holes; weighs 15 lbs; adapted for prospecting, etc.

Victor Electric Platinum Fuses Superior to all others for exploding any make of dynamite or blasting powder. Each fuse folded separately and packed in neat paper boxes of 50 each. All tested and warranted. Single and double strength with any length of wires.

Blasting Machines. The strongest and most powerful machines ever made for electric blasting. They are especially adapted for submarine blasting, large



MANUFACTURED ONLY BY

JAMES MACBETH & CO.,

120 Malden Lane, New York, U. S. A.

BRANCH OFFICE: 308 MARKET STREET, SAN FRANCISCO, CAL.

## Second Hand Machinery.

### Specialties

PULLEYS

SHAFTING

BELTING

BOXES

RAILS

BOILERS

ENGINES

HOISTERS

STAMP MILLS

CABLE and all but little used

### THE S. S. MACHINERY CO.

Denver, Colorado.

## J. A. FAY & EGAN CO.

CINCINNATI, OHIO

## Wood Working Machinery

— FOR —



Box Factories, Planing Mills, Sash, Door & Blind Factories Carriage, Wagon and Agricultural Shops.

HENSHAW, BULKLEY & CO., Agents,

San Francisco, Cal.

## Ores! Ores! Ores!!

Gold, Silver and Lead Ores and Concentrates

Purchased at Reduced Rates for Treatment.

## Selby Smelting and Lead Co.

416 MONTGOMERY ST., San Francisco

Consign Shipments to Vallejo Junction, Cal.

## Randsburg Gold Fields

REACHED VIA

### Santa Fe Route

Leave Los Angeles, 10:10 a. m.  
Leave San Bernardino 12:50 p. m.  
Arrive Barstow 3:40 p. m.  
Leave Barstow 3:55 p. m.  
Arrive Kramer, 5:05 p. m.  
Arrive St. Hilo, 6:25 p. m.  
Arrive Johannesburg 6:50 p. m.

Returning Trains Leave  
Johannesburg 8:00 p. m.  
Arrive San Bernardino 8:45 a. m.  
Arrive Los Angeles, 8:25 a. m.

A through passenger coach is run between Barstow and Johannesburg.

Through tickets and particulars of any Santa Fe Route Agent.

Stage leaves Johannesburg for Ballarat on Mondays and Thursdays at 7 a. m.; returning arrives at Johannesburg on Tuesdays and Fridays at 8 p. m.

SAN FRANCISCO OFFICE

628 MARKET ST.

LOS ANGELES OFFICE

200 S. SPRING ST.

# JEFFREY

Roller, Steel and Special Chains.

## ELEVATORS

JEFFREY

## CONVEYORS

FOR HANDLING MATERIAL OF ALL KINDS.

WIRE CABLE CONVEYORS.  
For long and short distance conveying.

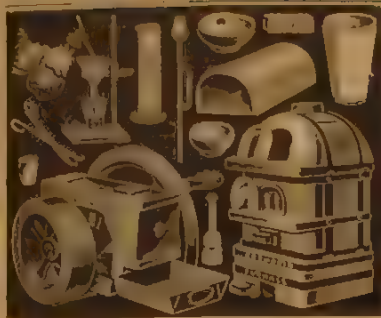
41 KEY STREET, NEW YORK

Send for Catalogue.

Western Branch,

412 17th Street, DENVER, COLORADO.





## THE Denver Fire Clay Co.

Assayers' and Chemists' Supplies

MANUFACTURERS OF  
Crucibles, Scorifiers and Flutes  
and all other kinds of  
FIRE CLAY MATERIAL.

SPECIALTIES: Strictly Acid Test  
Lead, Bone Ash, Cyanide Potash, Argol,  
Borax, Borax Glass, Iron Sulphides, Litharge,  
Soda, Mining Fluxes, etc.

SOLE AGENTS FOR THE  
Ainsworth Balances

Factory:

Office:

3101-3141 Blake St., 1742-1746 Champa St., Denver, Col.

## NEW HAVEN MFG. COMPANY

NEW HAVEN, CONN.

## IRON WORKING TOOLS,



Engine Lathes, Pulley Turning Lathes, Iron Planers  
Slotters, Upright Drilling Machines, Horizontal  
Drilling and Boring Machines, Etc.

HENSHAW, BULKLEY & Co., Agents, San Francisco, Cal.



SMITH & THOMPSON  
Manufacturers of

**Fine Assay Balances**

Write for Catalogue

2210 South St., Denver, Col.

## State Ore Sampling Co.

DENVER, COLORADO

We buy Gold, Silver, Lead, Copper, Blomouth, Uranium, Wolframite, Cobalt molybdenite and Antimony Ores.

We have modern mills for sampling ore. We also test ores for the new processes of reduction. Our long experience in the market enables us to pay the highest cash prices for all marketable ore. Write for our "Reference Book." Send analysis of your ore for prices and information.

BAILY & MONNIG, Managers

J. E. SEXTON,

Mining Engineer,

Placerville, Cal.

I can furnish developed or undeveloped gold mining properties to responsible parties, on their own terms, and attend to the operating of the same if desired.

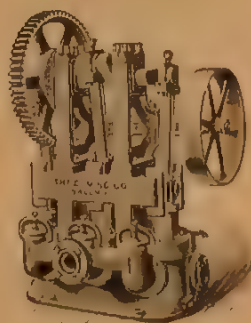
Correspondence solicited.

## THE DEMING

TRIPLEX POWER PUMP

The Best Made

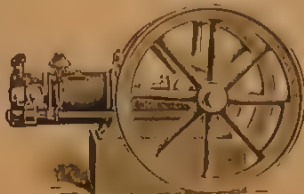
Steel Crank Shafts, Cut Gearing, Outside  
Packed Plungers, Single and Double  
Acting Triplex Electric Pumps



## THE OTTO GAS ENGINE

51000 IN ACTUAL USE

The Original, the Highest Efficiency and  
Most Economical



Henshaw, Bulkley & Co.,

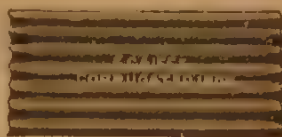
AGENTS

SAN FRANCISCO, CAL.

We Manufacture and Erect in All Parts of the United States

Steel Frame Mill Buildings, Trestles, Girders,  
Steel Tanks and Vats of every Description.

Sheet and Plate Iron Work.  
Riveted Steel Pipe. Stacks.



WM. B. SCAIFE & SONS.,

Established 1802.

Pittsburg, Pennsylvania

Used for Roofing and Siding  
of Buildings.



## To Gold Miners!

Silver Plated Copper AMALGAMATING PLATES

For Saving Gold In Quartz and Placer Mining.

EVERY DESCRIPTION OF MINING PLATES MADE  
Only Best Copper and Refined Silver Used. Old Min-  
ing Plates Replated. Twenty-six Medals Awarded.

Gold, Silver, Nickel, Copper & Brass Plating.

Old copper mining plates bought or taken in exchange for new silver-plated plates and full value allowed. Gold extracted from old plates at a moderate cost by a new and economical process. Old plates, which often contain a surplus of gold above the cost of plating, can be re-plated.

**Denniston's San Francisco Plating Works**

652 Mission Street, cor. Annie, San Francisco, Cal.

Telephone, Main 5031.

E. G. DENNISTON,

Proprietor

Send for Circular.



R. A. PEREZ, E. M.

Assayer and Chemist

Manager of the Bi-Metallie Assay Office and Chemical Laboratory

Assaying of Ores, Furnace Products, etc.  
Amalgamations and Cyanide Tests Carefully Made

Formerly: Underground and surface surveyor for the Cosquilla and Alamo Coal Cos.,  
Cosquilla, Mexico.

Assistant Chemist for the Wharton Iron Furnace, Port Oram, N. J.

Chief Assayer for El Paso Smelting Works, El Paso, Texas.

Assistant Chemist Consolidated Kansas City S. and R. Co., Argentine. Kan.

121 North Main Street,

Los Angeles, Cal.

ESTABLISHED 1859

Herman Kohlbusch Sr.

59 Nassau Street,  
New York, N. Y.

MANUFACTURER OF

**Fine Balances  
and Weights**

For every purpose where accuracy  
is required.

...

Send for Illustrated Catalogue



## THE WILSON

Forged High Grade Steel

**Shoes and Dies**

Guaranteed to Wear Longer and Prove Cheaper than any others.  
Made by use of Special Appliances, Patented Aug. 16th, 1893

Made only by

WESTERN FORGE AND ROLLING MILLS  
St. Louis, Missouri

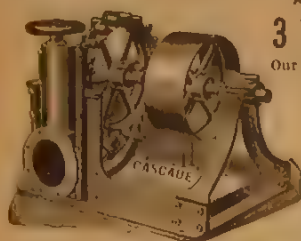
**JOSUHA HENDY MACHINE WORKS**

SOLE AGENTS

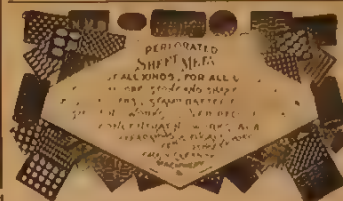
38 to 44 Fremont Street,

San Francisco, Cal



Turbine  
AND  
Cascade**WATER WHEEL**Adapted to all Heads from  
**3 Feet to 2000 Feet**Our experience of 33 YEARS  
building Water Wheels in  
addition to suit every require-  
ment of Water Power Plants.  
We guarantee satisfaction.Send for a Pamphlet of  
either Wheel and write  
full particulars.**James Leffel & Co.**  
SPRINGFIELD, OHIO, U.S.A.**The National  
Feed Water Heater**

Highest Premium at World's Fair

**800,000 HORSE POWER IN USE****SIMPLICITY  
CHEAPNESS  
RELIABILITY  
EFFECTIVENESS****Henshaw, Bulkley & Co.,**Agents,  
SAN FRANCISCO, CAL.**GOLD and SILVER** REFINERS & ASSAYERSBullion Bought - No charges for panning - Gold, Silver and Electrolytic at  
market prices. Assaying in all branches. Working tests made by all processes.  
Wastes and Concentrates bought - Prompt attention - Best facilities.  
Your Trade Solicited**Penn Smelting and Refining Works, 901-903 Filbert St. PHILADELPHIA, PA.****PERFORATED  
SCREENS****Steel Plate, Copper and Bronze**

For all uses - Send for Catalogue

**A. J. BECKLEY & CO.**

Works, Garwood, N. J.

New York Office, 123 Liberty Street.

**ROBINS BELT  
CONVEYORS**Handle Ore, Coal and Tailings; Save repairs,  
shutdowns, Power and Noise.**Robins Conveying Belt Co., 147-149 Cedar St., New York City****ORE TESTING**Complete mill for testing ores on practical scale by all processes to determine the best process  
adapted to treating any ore submitted. Processes in use investigated to overcome unnecessary  
losses, etc.**RICKETTS & BANKS,**Metallurgists & Chemists,  
NEW YORK CITY

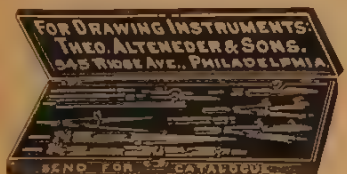
No. 104 JOHN STREET,

Mathematical, Scientific and Drawing Instru-



8 E Cor 7th and Chestnut Sts.

Philadelphia, Pa.

**OLIVER'S POWDER  
METEOR DYNAMITE****SUPERIOR STRENGTH  
FREEDOM  
FROM SMOKE**

Extra Strength for Heavy Rock Work and Ore Mining

**GELATINE**For Tunnel Work—free from  
Obnoxious Odors**The OLIVER POWDER CO.,  
OLIVER MILLS,**

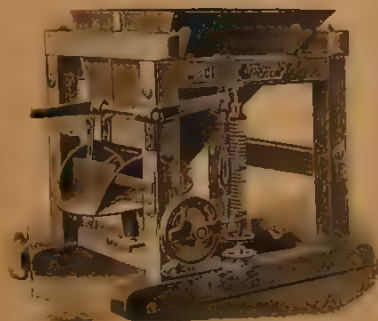
LUZ. COUNTY, Penn.

**OLIVER'S FLAMELESS  
DYNAMITE**

Will not Ignite Gas or Coal Dust. Does not shatter coal

**ALL GRADES OF MINING POWDERS A SPECIALTY****Mining, Milling, Smelting,****Concentrating, Chlorination,****and Leaching Machinery**

MANUFACTURED BY

**THE COLORADO IRON WORKS COMPANY****DENVER, COLORADO.****CHALLENGE ECLIPSE ORE FEEDER**  
Will feed both wet and dry ores

CATALOGUE ON APPLICATION

**BLACK HAWK ORE BREAKER**

ESTABLISHED 1860





THE BEST  
LOW PRICED GOOD  
STEAM ENGINE  
MADE

Governor and Belt, Fly Wheel, Driving Pulleys, Glass Oil Cups, Drain Cocks and Sight Feed Lubricator furnished with Engine. From four to twenty horse power.

**Globe Machine Works,**  
135-139 W. 2D ST. CINCINNATI, OHIO

## Perforated Metals

GRIZZLEYS FOR PLACER MINING, BATTERY SCREENS  
STEEL SHEETS FOR TROMMELS.

THE ROBT. AITCHISON PERFORATED METAL CO.  
269 Dearborn St., Chicago, Illinois

**FRANCIS SMITH & CO.,**  
MANUFACTURERS OF



MINING PIPE ALL SIZES

Hydraulic, Irrigation and Power Plants, Well Pipe, Etc., all Sizes.

Iron cut, punched and formed, or making pipe on ground where required. All kinds of Tools supplied for making Pipe. Estimates given when required. Are prepared for coating all sizes of Pipes with Asphaltum.

46 Fremont Street

San Francisco, Cal.

HOME MANUFACTURE  
**FOWLER'S**  
Air Space and Asbestos  
Manufacturing Company  
Sectional Removable Covering  
for Steam Boilers, Pipes, etc.  
As a Non-Conductor, Unequaled  
Absolutely Fire Proof



G. C. FOWLER, 656-58 Howard Street  
SAN FRANCISCO, CAL.

**W. O. ABBOTT, . . . . ASSAYER . . . .**

ASSAYING IN ALL ITS BRANCHES  
CHEMICAL DETERMINATIONS ACCURATELY MADE

TOMBSTONE - - - ARIZONA

## Sulphuric Acid

Manufactured by the **Denver, Col.**  
Western Chemical Co.  
For Chlorination Refining and other processes. Also Muriatic and Nitric Acids, Blue Vitriol, Copperas Refined Sulphate of Soda, Etc.

Also Strictly Chemically Pure

**AMMONIA** and

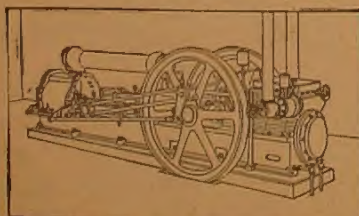
for Laboratory Use and Fine Chemical Work.

## C. P. Acids

## NORWALK IRON WORKS CO.

SOUTH NORWALK, CONNECTICUT.

### THE NORWALK AIR and GAS COMPRESSOR



In use in every State in the Union, Central America, and South America, Great Britain, etc., Also used by the U. S. Army and Navy.

**Especially Designed for Driving**

ROCK DRILLS,  
PNEUMATIC LOCOMOTIVES,  
ENGINES, PUMPS  
COAL CUTTERS.

and Other Mining Machinery. The Best Machine for Compressing Air for all Dynamic Purposes. Send for Illustrated Descriptive Catalogue.

**HENSHAW, BULKLEY & CO., Agents** San Francisco

## Eastern Prices Beaten

Improved Facilities, Finest Work Lowest Prices

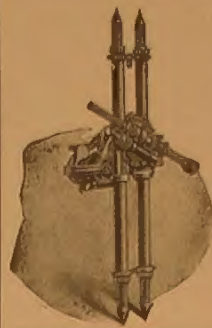


Perforated Sheet Metals

For Flour and Rice Mills, Grain Separators, Shaker Screens, Gravel and Cement, Stamp Batteries, Iron, Steel, Russian Iron, American Planish, Zinc, Copper and Brass Screens, for all uses.

**San Francisco Pioneer Screen Works**  
(ESTABLISHED 1860)

221 and 223 First St., San Francisco, Cal.  
JOHN W. QUICK, PROPRIETOR



## DIAMOND Prospecting Drills

Machines of all Capacities

**American Diamond Rock Drill Co.,**

P. O. Box 1442

120 LIBERTY ST., N. Y.

## Gold, Silver, Iron, Copper, Zinc and Lead MINES

**PARTNER WANTED, (Miner Preferred)** who would invest \$20,000 in developing five large mining properties located in the Territory of Tepe, on the Pacific Coast. The Gold Mines ore averages from 3 oz. to 30 oz per ton of 2,000 lbs. Silver, from 1 kilo to 35 kilos. Lead, from 15 per cent. to 31 per cent. Zinc, 30 per cent; Copper from 5 per cent. to 25 per cent.

Water Falls, 800 H. P., and sufficient timber for mining use, close to the mines.

Maps, reports, and Samples sent on application. Call on or address to

**Lic. Elias Galindo,**  
Iturbide St., No. 94 Tepe, Mexico

## WOODBURY CONCENTRATOR



223 First St., San Francisco, Cal.



**Quartz Screens**

A specialty. Round, slot or buried slot holes. Genuine Russia Iron, Homogeneous Steel, Cast Steel or American planished Iron, Zinc, Copper or Brass Screens for all purposes. CALIFORNIA PERFORATING SCREEN CO., 145-147 Reale St., S.F.

**C. W. Kempton & Percy B. McCoy**

MINING ENGINEERS

29 Broadway, New York  
Mining, Milling, Metallurgy, Exploration.  
Cable, MACTON, NEW YORK  
Bedford McNeill's Code

## P. & B. PAINT



FOR MINES, SMELTERS, CHLORINATION WORKS,  
THE CYANIDE PROCESS.

P. & B. Roofing put up in Rolls to lay 200 square feet, with Paint and Nails. Absolutely Acid and Alkali Proof.

**PARAFFINE PAINT CO., Manufacturers,** 312-314 W. 5th St., Los Angeles

## UNFAIR COMPETITION

Our recent announcement that inferior goods had been sold and billed on the Coast as our goods, and that our trademark numbers had been counterfeited, has disclosed an even greater extent of these practices than we had supposed to exist. To make the resulting damage to the reputation of our goods as small as possible and to protect our would-be patrons we repeat:

All our catalogue goods, except those listed by us as manufactured by others, are stamped with our name "Keuffel & Esser Co." or our initials "K. & E. Co.," and where there is room for it, with our trademark. Our German drawing instruments bear only the trademarks  or  only, and goods so stamped are therefore not ours. All our goods are fully warranted to conform to the description we give of them in our catalogue and to be of the quality and grade specified. We make some lines of cheaper goods for the jobbing trade, but they differ from our catalogue goods in quality and appearance. These inferior goods are not stamped with any of our trademarks. Our catalogue goods are not furnished to any dealer or agent without our complete stamp as described above, and any claim that we furnish our catalogue goods by special arrangement without our stamp is therefore an attempt to deceive. Our special papers in rolls or sheets

## Duplex Universal Anvil Baragor Normal

are watermarked or stamped along the edge with their name. Any claims that our papers are furnished by us in bulk without these names or that these papers have been obtained otherwise than through us, are absolutely false. We will thankfully accept any information bearing on the counterfeiting of our trademark numbers or the palming off of other goods as ours.

Very respectfully, KEUFFEL & ESSER CO., New York



**Independent Assay Office.**

ESTABLISHED 1888.

D. W. Reckhart, E. M., Proprietor.

Agent for Ore Samples.

Assays and Chemical Analysis.

Miner Examined and Reported Upon.

**BULLION WORK A SPECIALTY.**

P. O. Box 88, Office and Laboratory.

Cor. San Francisco and Clitasha Sts.,

EL PASO, TEXAS.

## GASOLINE ENGINES

Gasoline Engines from 2 to 10 horse power. Mine ventilators operated by Gasoline Engines.

**TEMPLE MACHINE CO.,**

1313 Wazee Street, Denver, Colorado



## Buyers of

ALL CLASSES OF  
BULLION, MATTE,  
ORE, SILVER SUL-  
PHIDES,  
CYANIDES, GOLD  
and SILVER BARS.

# CONSOLIDATED Kansas City Smelting AND Refining COMPANY

SMELTING WORKS  
LEADVILLE, COLO.; EL PASO, TEXAS;  
ARGENTINE, KAN.; DOUGLAS, MEX.

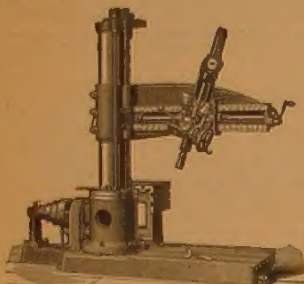
REFINERY:  
ARGENTINE, KANSAS

ORE PURCHASING AGENCIES:  
C. D. Porter, Spokane Wash.; J. H. Weddle, Leadville, Col.  
J. H. Murray, Denver, Colo.; L. P. Feustman, City of Mex.  
J. R. Jackson, Salt Lake City Utah; H. R. Simpson, El  
Paso, Texas; C. E. Finney, Argentine, Kansas.

## Manufacturers of

ALCHEMIST-  
BRAND  
BLUE VITROL  
ZINC SULPHATE

## Half Universal Radial Drills



The special features which have so highly recommended this style of Drills are our double columns, steel gearing, power and hand feeds, quick return motion to spindle. Furnished in three sizes, with large variety of tables, adapting the drills for every class of work possible.

### Bickford Drill and Tool Co.

CINCINNATI, OHIO, U. S. A.

HENSHAW, BULKLEY & CO., AGENTS

San Francisco, Cal.

## ORE CARS.

All miners who have used the Truax Automatic Ore Cars say they are the best in the market.

Over 3,000 In Use

MANUFACTURED IN

SAN FRANCISCO, CAL., by  
The Truax Mfg. Co.,  
114 First Street



PATENTED:  
Jan. 8, 1892. Aug. 7, 1895.  
July 19, 1898.  
In Canada, June 21, 1898.

MANUFACTURED IN

DENVER, COLORADO, by

The Truax Mfg. Co.

1717-1719 Wazee St.

We make all kinds of cars, skips and charging carts for the Mine, Mill and Smelter. All miners should have our pamphlet of useful information.

Dealers wanted in Mining Sections to handle the TRUAX ORE CARS.

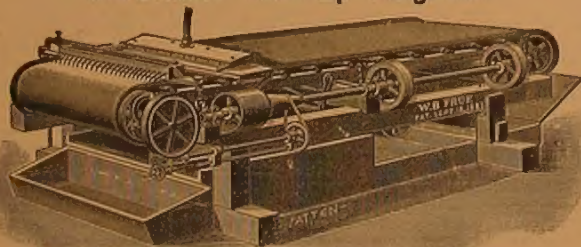
## THOMAS PRICE & SON

Analytical Metallurgical and Physical Testing Laboratory

524 SACRAMENTO STREET, SAN FRANCISCO, CAL.

## FOUR and SIX FOOT FRUE VANNERS

With Brownell "Patent Lip" Flange Belts



After a Concentrator like the Frue Vanner has been on the market nearly two decades, and the sales have constantly increased, it is safe to say it is the "Standard Machine of the world." More Frue Vanners have been sold during the last twelve months than for the same period at any time during the history of the machine. Practical mining men in all parts of the world where mining is carried on will testify as to its merits. It is the "Standard" which all competitors are trying to imitate.

The results obtained by this machine are the "Acme" of concentration, and several cheap and untended machines that have lately come on the market compare by it, and the manufacturers will tell you that they are "just as good, and cheaper, etc." The facts are that no other concentrator made has an equal capacity, or will yield as clean a concentrate with as small loss in the tailings as the Frue Vanner. The amount saved from the lower first cost of an inferior machine counts little in the years results, when compared with the increased output from a Frue. This machine not only gives better results at both ends of the belt (i. e. Clean product and poor tailings), but is operated at less expense and requires less attention than any other machine on the market. At the Alaska Treadwell Mine where they have ordered over 350 Frue Vanners one man attended 48 machines for 12 hour shift.

FOR DESCRIPTIVE PAMPHLETS, ADDRESS

JAS. S. BROWNELL, Western Agent

132 Market Street,

FRUE VANNING MACHINE CO.

(Successor to Adams & Carter)

SAN FRANCISCO, CAL.

## MINERS' OUTFITS.



IRON MORTARS,  
AMALGAM MORTARS,  
GOLD WASH PANS,  
MINERS' HORNS,  
BATEAS, CRUCIBLES,  
HORSE-SHOE MAGNETS  
MAGNIFYING GLASSES  
IRON RETORTS,  
CHEMICALS, SCALES,  
WEIGHTS, ETC

Including a full assortment of Mine and Mill Supplies, Assayers' Materials, Etc.

Sole Agents for the Pacific Coast for the

W. S. TYLER WIRE WORKS CO.  
Manufacturers of

Steel and Brass Wire Battery Screens

Agents for Baker & Adamson's Chemically Pure Acids. A full Stock always on hand.

Nitric Acid, sp. gr. 1.42; Muriatic Acid, sp. gr. 1.20; Sulphuric Acid, sp. gr. 1.845.

JOHN TAYLOR & CO.

83 FIRST ST., SAN FRANCISCO

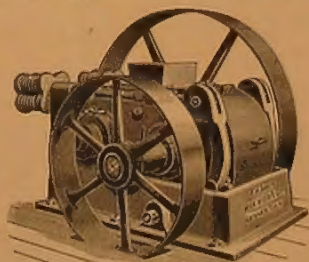
Prices on application.

## The F. M. Davis IRON WORKS CO.

Office and Works 723 to 743 Larimer Street

Corner 8th Street, DENVER, COL.

## The DAVIS RUSHING ROLLS



## SIMPLE, DURABLE, EFFICIENT

These machines are built in 5 sizes 27"x14". Belt Driven, \$950.00. Weight 13,000 pounds.

SEND FOR CATALOGUES and DISCOUNTS.

## L. Manasse Company

Mfg. Optic lenses

88 Madison Street Chicago.

Manufacturers and Importers of Architects, Engineers and Surveyors Supplies.

Optical Instruments of every description. Barometers, Thermometers, Field Glasses, etc. Catalogues on application.



## JOHN T. REED

Assayer and Analytical Chemist

Assays made for all valuable metals. Analytical made of all valuable minerals. Special attention given to the sampling of mines. Estimating the value of and testing the nature of their ores. 100 pound lots of ore sampled, and working tests made by Cyanide, Amalgamation and Chlorination Processes.

OFFICE 522 COURT STREET.

San Bernardino, - - California

## GOODSELL'S "98" PUMP PACKING



WAX END SEWED.

Patent Pending

No possibility of Splitting. All imperfect features of Duck packing overcome. Price 75c lb net.

Goodsell Packing Co.,

33 South Canal Street Chicago, Illinois

## SWEEPINGS ★

Metallic Wastes, Dental Scraps, Photographers' Wastes, Jewelers' Sweepings, Mill Wastes, Amalgamated Plates, Old Iron Retorts, Old Quicksilver bought.

A. M. DONALDSON & CO., 1661 Larimer St., Denver, Colorado

## The Little Alaska Gold Washer

A simple, practical, indestructible gold washer, combining the principles of gravity and centrifugal motion, and at a price and weight far below any washer ever invented. In working the operator does not have to wet his hands nor hold the weight of the dirt in his arms. These washers have been used on the desert for the last 18 months with water at \$1.50 per barrel. Under ordinary conditions the rate of working is a pan a minute, and under all conditions the result is always the same IT SAVES ALL THE GOLD.

Send for catalogue and information to

RUSSELL & KINSEY,

204 South Broadway, Los Angeles, Cal.





## THE CUMMER DRYERS.

**FOR DRYING ...  
... EVERYTHING  
MECHANICALLY**  
Concentrates, ores, coal, bricks, clay, etc.  
No Steam is used.

Hundreds in Operation

F. D. CUMMER & SONS CO., CLEVELAND, OHIO

## "Impulse" Water Wheel

Highest Efficiency. Best Mechanical Construction. Never a wheel used but highly commended by user. "A pleased customer is the best salesman."

CATALOGUES ON  
APPLICATION

**American Impulse Wheel Co.**

120 LIBERTY STREET, NEW YORK

Advertise

Your  
Wants

IN THE

**Mining and Metallurgical Journal**

SEE Wants Page 8a for further particulars.

## THE NATIONAL IRON WORKS



Riveted Boilers, Tanks, and Sheet Steel or Iron Work of every description.

MANUFACTURERS OF THE

National Steel Ore Car

Repairing of All kinds Promptly Attended to.  
PORTLAND, OREGON

## MONTANA ORE PURCHASING CO.

F. AUG. HEINZE, Pres. and Genl. Mgr.  
JOHN MacGINNISS, Vice-Pres.

ARTHUR P. HEINZE, Sec.  
STANLEY GIFFORD, Treas.

Authorized Capital, \$2,500,000; Issued, \$2,000,000.  
Surplus, \$1,250,000.

PURCHASERS, SMELTERS and REFINERS OF

**Copper, Silver and Gold Ores.**

Smelting Works: BUTTE, MONT.

Offices: BUTTE, MONT., and 100 BROADWAY, NEW YORK.

Established 1887

B. Sc. Members American Chemical Society

## WADE & WADE ASSAYERS

Chemical Analysis, Milling, Concentration and Cyanide Tests  
Call and See our Stamp Mill and Frue Vanner 115 1/2 N. MAIN ST., LOS ANGELES, CAL.

## Cyanide Potassium

99 per cent. pure, Beckton Brand,

MADE BY THE

Gas Light and Coke Co., London,  
AND ALL OTHER CHEMICALS.



Please  
Apply to

**Schoelkopf, Hartford & MacLagan, Ltd.,**  
100 William St., New York.

## The Imperial Gas Lamp

Fully covered  
by U. S.  
Patents

The Imperial Gas Lamp burns ordinary gasoline, and gives 100 candle power light, without danger and with no odor and no smoke.

The Imperial is admittedly the most perfect light on the market as well as the MOST ECONOMICAL.

It is the result of years of experiment and study and represents as nearly as possible the perfect light, at the minimum cost for maintenance. Many thousands of these lights are now in use and have only to be seen to be adopted. The fixtures are made of the best polished brass and every part is the best obtainable. Every lamp is thoroughly tested, and will be sent, securely boxed, and with full directions, on receipt of price. The Imperial Gas Lamp fully satisfies. Send for catalogue, showing other designs.

## The Imperial Gas Lamp Co.

132 and 134 Lake St., Chicago, Ill.

Advertise in the  
Mining and Metallurgical  
Journal.  
The Only Exclusive Mining  
Publication in the  
West.

A. H. HANDLAN,  
President and Manager

E. W. HANDLAN,  
Secretary and Treasurer

## M. M. BUCK MFG. CO.

Railway and Contractors Supplies

Machine Tools, Heavy Hardware and Metals; Mine, Mill, Smelter and Foundry Supplies; Manufacturers of Locomotive Head Lights; Train and Station Signal Lights, Lanterns, Oil Filters, Lubricators, Injectors, &c.

92 North 3d Street,

St. Louis, Mo.



## The Pulsometer Steam Pump

"THE MINER'S FRIEND"  
Often Imitated—Never Equaled  
Over 20,000 in Use

RECENT IMPORTANT IMPROVEMENTS

The Handiest, Simplest and Most Efficient Steam Pump for General Mining Quarrying, Railroad, Irrigation, Drainage, Coal Washing, Tank-filling and for Pumping Back Liquids heavily impregnated with sediment. Muddy or gritty liquids handled without injury to the Pump.

AGENTS

PARK & LACY CO., A. M. HOLTER BROS. CO., MITCHELL-STAVEL & LEWIS CO.  
San Francisco, Cal. Helena, Mont. Portland, Oregon.

CATALOGUE ON APPLICATION  
CORRESPONDENCE SOLICITED

**Pulsometer Steam Pump Co.**

122 Greenwich Street, New York City

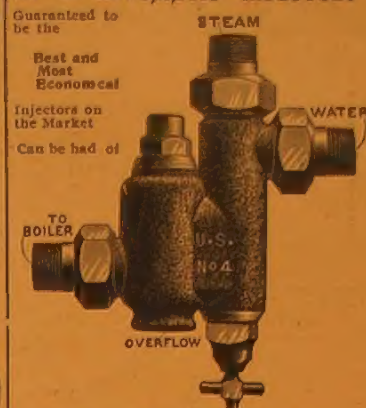
## U. S. AUTOMATIC INJECTORS

Guaranteed to  
be the

Best and  
Most  
Economical

Injectors on  
the Market

Can be had of



Mitchell Stavel & Lewis Co., Portland, Or.  
Mitchell Stavel & Lewis Co., Seattle, Wash.  
Schaw-Ingram Batcher Co., Sacramento, Cal.  
Henshaw, Bulkeley & Co., San Francisco, Cal.  
And of Jobbers and Dealers generally.  
Catalogue Free.

American Injector Co., Detroit, Mich.  
U. S. A.

Subscribe for the Mining and  
Metallurgical Journal.

JENA  
Normal  
Glass

Trade Mark



BEST  
GLASS  
FOR  
Labora-  
tory use

CHEMICALS AND  
CHEMICAL APPARATUS

ASSAY BALANCES  
Finest Ever Made

Specialties:—Analytical Portable Balances, Porcelainware, Platinum goods, Crucibles, Cupels, Scorifiers, Muffles, Furnaces, C. P. Acids, etc.

Everything Necessary for Assayers

Elmer & Amend,

3d Ave. Cor. of 18th St. New York



# The Jackson Hand Power Rock Drill



THORNTON N. HOTLEY COMPANY, (Inc.)  
43 John St., New York.

Handled and Operated by One Man will do the work of Two to Four Men.

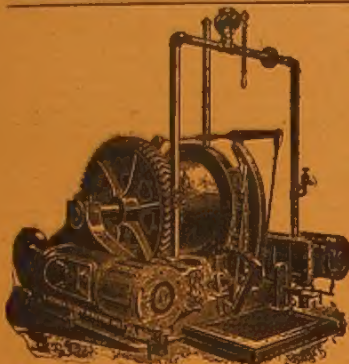
## We Supply Everything for Mines and Mining

### THE JACKSON DRILL & MFG. CO.

Write for Circular.

1756 Larimer Street, Denver, Colo.

IT PAYS TO ADVERTISE IN THE MINING and METALLURGICAL JOURNAL



DOUBLE CYLINDER HOISTING ENGINE

## JOSHUA HENDY MACHINE WORKS, Nos. 38 to 44 Fremont St.

SAN FRANCISCO, CAL.

Manufacturers of and Dealers in

The Latest Improved

### Quartz Milling, Pumping, Hoisting and Smelting Plants, Air Compressors and Rock Drills.

### "HENDY" IMPROVED "TRIPLE-DISCHARGE" TWO-STAMP QUARTZ MILLS Boilers, Engines & Pumps of all capacities

PLANS, SPECIFICATIONS and ESTIMATES OF COST SUBMITTED and CONTRACTS ENTERED INTO  
FOR FURNISHING and ERECTING MINING and MILLING PLANTS for all conditions of Use.

# BAKER IRON WORKS

LOS ANGELES, CALIFORNIA

Manufacturers of

Mining and Milling Machinery, Atlas Engines and Boilers, Worthington Steam Pumps

Water Works Machinery  
A SPECIALTY

ESTABLISHED 1871

C. L. BERGER & SONS  
Successors to

**BUFF & BERGER**

Mining and  
Engineering Transits

With patent interchangeable  
auxiliary Telescope for use on  
top or side in vertical lighting.  
Our friends are cautioned  
against infringements foreign  
or domestic as attempts have  
been made of late to mislead  
the public.

Send for Illustrated Catalogue and Manual

11 Province Court, Boston, Mass.

## ANTIMONY.

We buy Antimony Ore in any quantity and pay prompt CASH for same. Write us and let us know what you have.

Chapman Smelting Works Co.,  
(INCORPORATED)  
422 Battery Street. San Francisco.

**NEW STANDARD CO.**  
INCORPORATED

Manufacturers of the New Standard  
**CONCENTRATOR**  
323 POTOMAC BLOCK, LOS ANGELES, CAL.

## MINE AND MILL SUPPLIES

Steam and Gasoline Engines and Hoists

Giant Rock Drills

Ore Cars and Drills. Iron and Steel.

**JOHN WIGMORE & SONS CO.**

117-123 South Los Angeles St.,

Los Angeles, Cal.

## Mining Timbers and Construction Lumber

(Caleasieu Long Leaf Yellow Pine Lumber)

Prices given for delivery to any point in Mexico by Rail through Porfirio Diaz, Nuevo Laredo or Paso del Norte, and by Vessel through Gulf Ports of Tampico and Vera Cruz.

## Bradley-Ramsay Lumber Co.

LOUISIANA, U. S. A.

ADDRESS INQUIRIES FOR PRICES TO

**R. N. WATSON, AGENT.**

APARTADO NO. 118 MONTREY, N. L. MEXICO

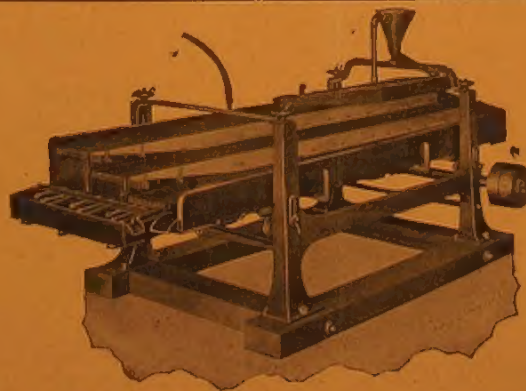
## THE BARTLETT CONCENTRATING TABLE

One of these Machines will take the place of TWO or THREE Belt Concentrators of any make and do as good work. Separates ALL the minerals from each other at one operation. Gives THREE CONCENTRATES on the one Machine at the same operation. The Machine is especially adapted to the separation of Zinc and Lead.

**Price, 12-ft. Table, \$350**

Shipping Weight 2200 Pounds  
Capacity, 10 to 30 tons per 24 hours

Licenses for the  
Manufacture and Sale



**PARKE & LACY COMPANY,**

21 and 23 Fremont Street  
SAN FRANCISCO, CAL.

Parties desiring tests made can send 500 lbs. or more, charges prepaid, and a run will be made and reports forwarded of the results free of all charges, except for the assay, which will not exceed \$10.00.

**CAN BE SET UP ANYWHERE.**  
Requires No Special Foundation

Sole Agents for Ingersoll-Sergeant Rock Drills and Air Compressors, Knowles Pumps and Pulsometer Pumps, Bullock Diamond Drills.

Los Angeles, Cal. Office,  
W. H. Miller, Representative  
306 Byrne Building